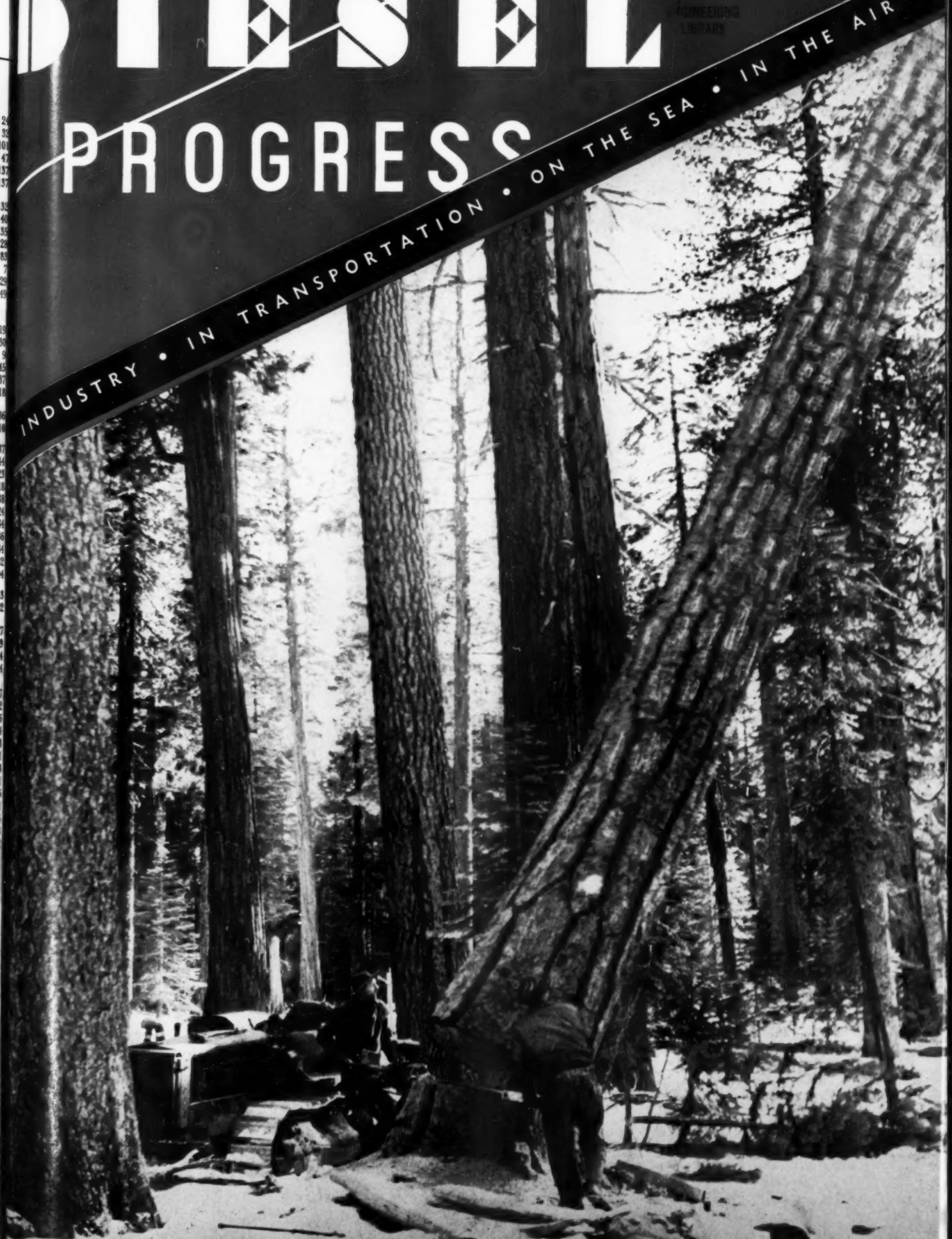
DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR



NOVEMBER, 1945

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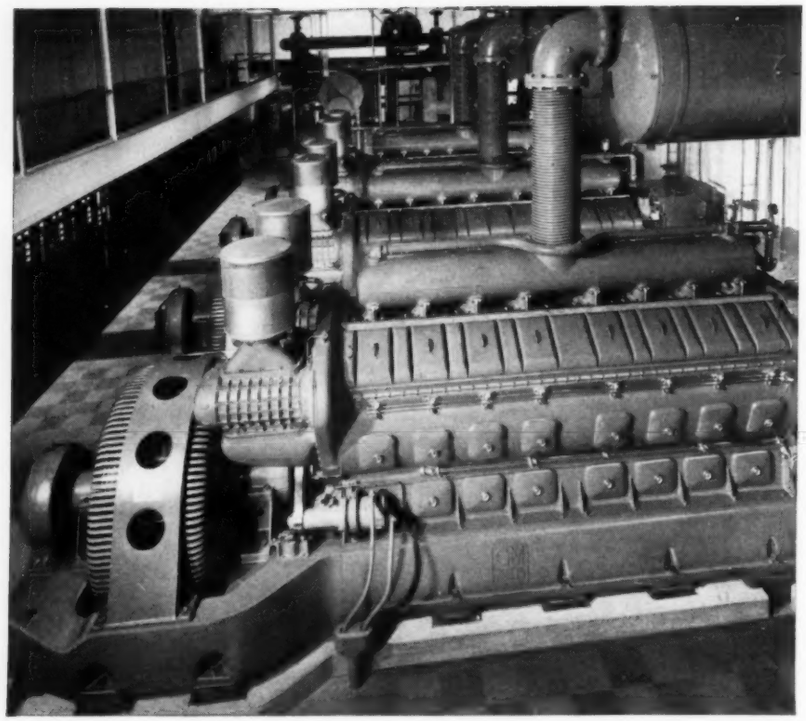

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TEXACO Ursa Oils

FOR ALL DIESEL ENGINES

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS

DIESEL PROGRESS, for November, 1945. Volume XI, Number 11. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 W. Forty-fifth St., New York 19, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1943, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: $5.00 per year, single copy, 50

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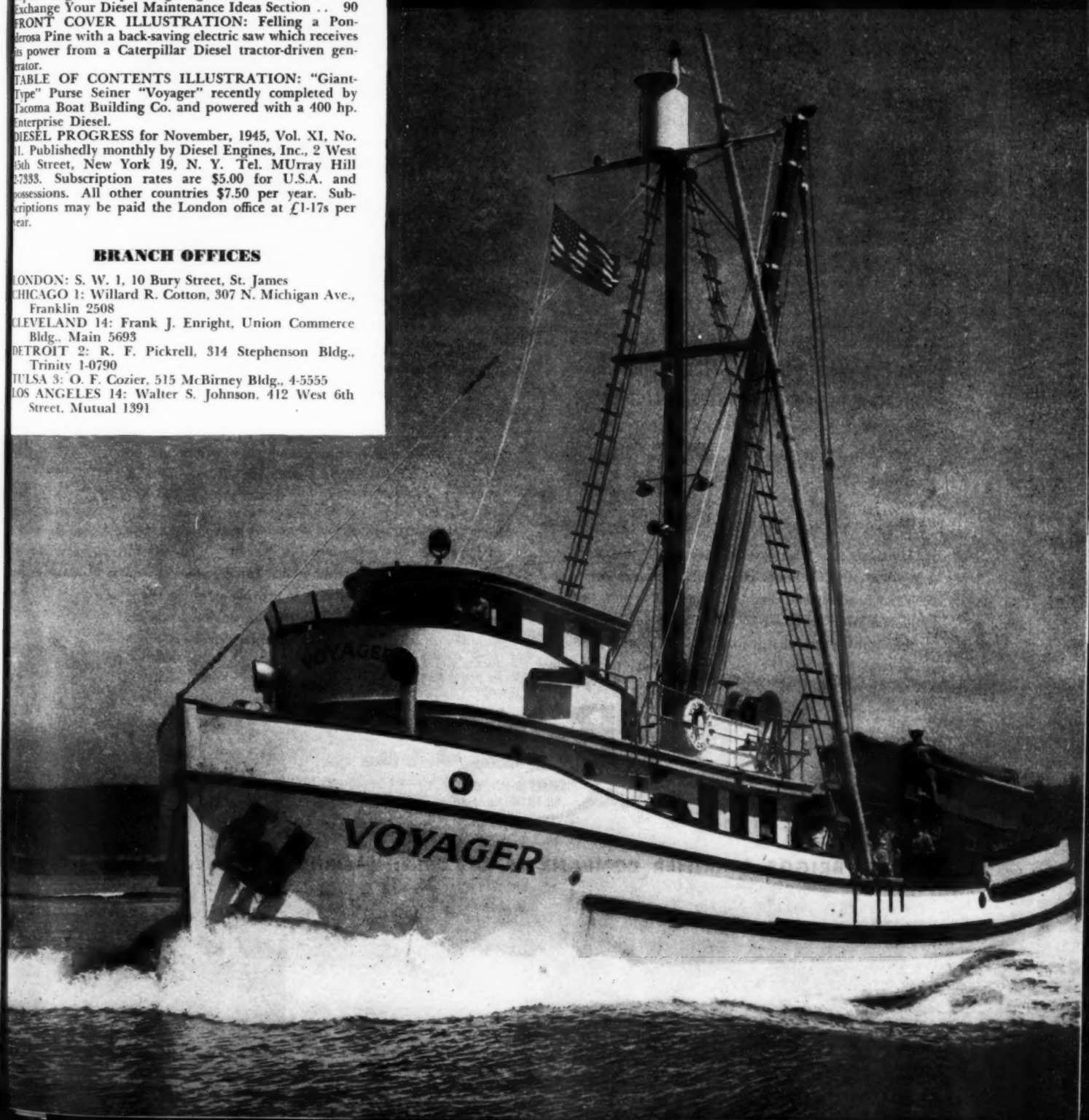
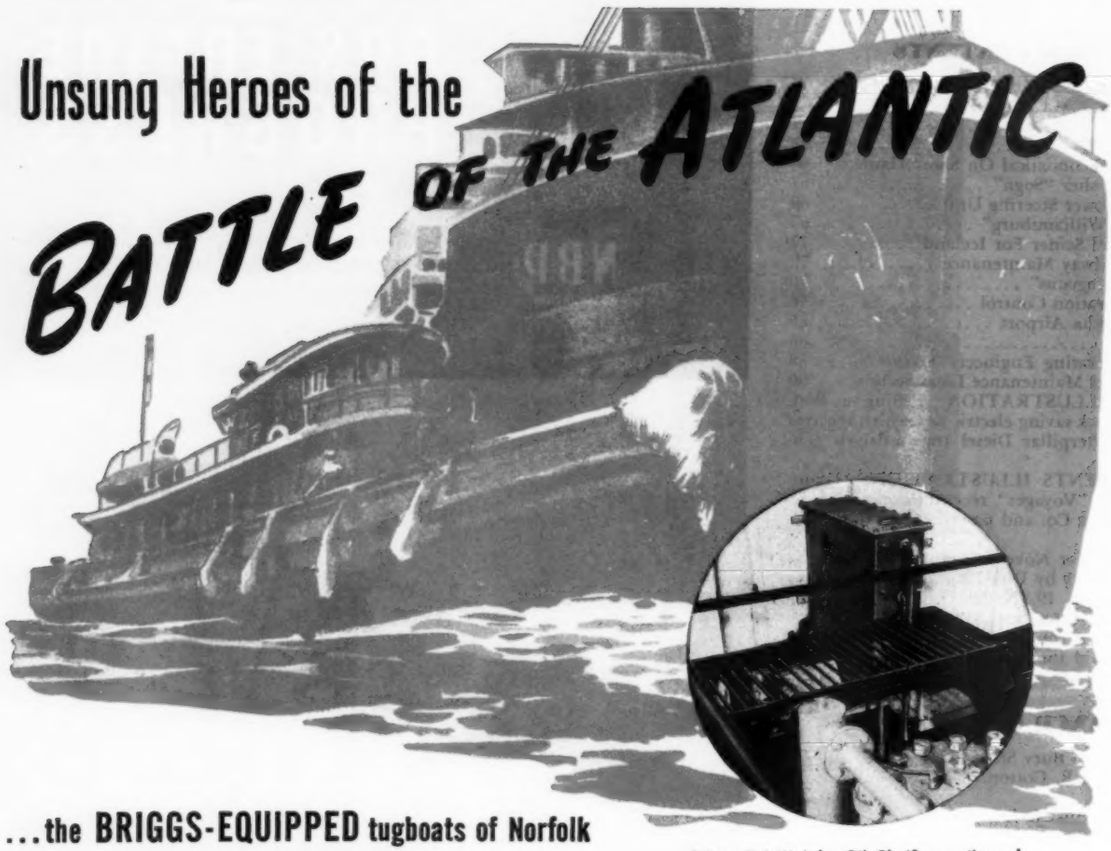


Unsung Heroes of the BATTLE OF THE ATLANTIC



...the BRIGGS-EQUIPPED tugboats of Norfolk Harbor--where ships by the thousands cleared to join the "bridge of ships"...

Briggs D-4-AX Lube Oil Clarifier continuously maintains oil in top condition. Average cartridge life is 500 hours. Oil changes are not necessary.

During the past three years, the 28 tugs of the Wood Towing Company have handled 90% of the traffic in busy Norfolk, Virginia, harbor. Half of these tugs are Diesel-driven... equipped with Briggs Lube Oil Clarifiers.

All these tugs average 108 hours per week of hard work . . . 5600 hours per year! They are overhauled annually to replace rings . . . required or not. Average annual wear on liners is .002". The chief engineer of the company says that it would take 4 hours periodically to clean engines if Briggs Clarifiers were not installed and . . . "If clarifiers were not on engines it would be necessary to tear down engines every six months and *chisel out rings.*"

Consult the Briggs distributor nearest you on problems of filtration on your engines . . . whatever their size or type . . . for fuel or lubricating oil. You'll learn why and how Briggs Clarifiers are able to provide extra efficiency, lower operating costs, longer life for engines. *Briggs distributors are listed in most classified telephone directories under "Filters."*

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PIONEERS IN MODERN OIL FILTRATION

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Bulldozer-equipped Diesel tractor pushes ties over the brink in a hurry.

DIESELS HELP TIE DRIVE

By HARRY WALKER

FOR the first time in 30 years of traditional river-driving of railroad ties for 100 miles down the twisting Wind River in Wyoming, Diesel power put on a show that promises "command" performances in future enactments of this annual Western drama.

The Wyoming Tie & Timber Co. conceived the idea of using a bulldozer to break landings or minor bank jams and to push the ties into the river off the docks—with spectacular results. As far as is known, the technique has never been employed in comparable operations.

This season's cut of both sawed and hand-hewn ties, all used by the Chicago and Northwestern R. R., was stacked, as is customary, along the river bank several miles above the town of Dubois, over a year's time. Stacked three tiers deep and about 20 ties high, the decks of ties extended more than a quarter-mile along the river bank.

Jams like this delay the drive until they are broken up.

A driving crew of from 50 to 60 men, mostly German prisoners of war, were of primary assistance, especially in clearing up knotty jams of ties in mid-stream. But the company found that an Allis-Chalmers, G.M. Diesel tractor, equipped with a wide bulldozer blade, was of tremendous value in the operation. The tractor was able to shove a whole section of three tiers of piled ties into the water with ease—and was of great assistance in other heavy work along the banks, according to R. Van Metre, president.

The ties, cut from tall lodgepole pine on the high slopes of the Washakie Division of the Shoshone National Forest, this season numbered 150,000—the least number in the company's history. Operations began in 1914 when the Wyoming company was organized. Since then, the tie drive has been an annual event each autumn after the high water in Wind River has receded. Van Metre estimates about 8 million ties—over 336 million board feet of timber—have been cut since operations began. Peak year was in 1927, when 700,000 ties—at that time all hand hewn—were driven down the river.

Spectacular jams often occur when the ties reach the narrow canyon sections of the river a few miles below Dubois and several of these enlivened the drive this season. Approximately 20 days is required to deliver the ties into the boom at Riverton, 100 miles below the point where they enter the water and an additional 20 miles from where the trees are felled in the forest. At Riverton, the ties are "yarded" or stacked awaiting shipment by the C&NW as needed.

Indications that Diesel equipment will occupy an increasingly important position in the company's future operations were given DIESEL PROGRESS by President Van Metre, who said: "We have built and are now building many miles of roads to reach timber previously inaccessible under old methods of logging—and are using bull and angledozer equipment in construction and trucks for hauling the lumber and ties. For our six sawmills, we use all types of engines—whatever has been available—gasoline and Diesels. Eventually, Diesels will probably replace other types, when available."

Snapped just before start of trial run, left to right: R. L. Burke, Vice President, Sun Shipbuilding and Dry Dock Co.; Admiral H. L. Vickery, Chairman, U. S. Maritime Commission and R. E. Friend, President, Nordberg Manufacturing Co.

The 6000 hp. Diesel Victory ship, "Emory Victory," see as she started down the Delaware for first trial run.

Group of notables as they boarded the "Emory Victory" for trial run.

THE TRIAL OF U. S. M. C. SHIP "EMORY VICTORY

By WILBUR W. YOUNG

AT long last the first Diesel propelled ship of the United States Maritime Commission Victory class, designated as VC2-M-AP4 cargo-vessels, went to sea for trials late in September. She is the *Emory Victory*—a fine, sturdy ship—powered with the first of a new line of Nordberg single acting, 2-cycle Diesels in the uppermost output brackets which were described in the June 1944 issue of DIESEL PROGRESS. Back then this 6000 hp. (normal) Diesel stood on the test block, having successfully completed test runs ranging up to 125% load (7300 shp.) for two hours, awaiting a hull for installation. So—at long last, hail the *Emory Victory*—a potential history-maker.

The hull, built by Bethlehem-Fairfield Shipyard, Inc., Baltimore—a subsidiary of Bethlehem Steel Co., was towed to the yard of Sun Shipbuilding and Dry Dock Co. at Chester, Pa., where machinery was installed and outfitting was completed to plans prepared by George G. Sharp. She is a sizable ship with length between perpendiculars, 436 ft. 6 in.; breadth moulded, 62 ft. 0 in.; and depth to main deck 38 ft. 0 in. Of 14,900 gross tons she has a total bale capacity of 443,790 cu. ft. in five main dry cargo holds with deep tanks for fuel oil or ballast. Profile is characterized by the full raised forecastle, midship house and superstructure and cruiser-type stern. There is a platform deck forward of the machinery space and platform deck aft no. 4 and 5 holds at level of the shaft tunnel. She carries a total complement of 84, twenty-four of whom are in the Deck Department and twenty in the Engine Department, the balance comprised of various ships services.

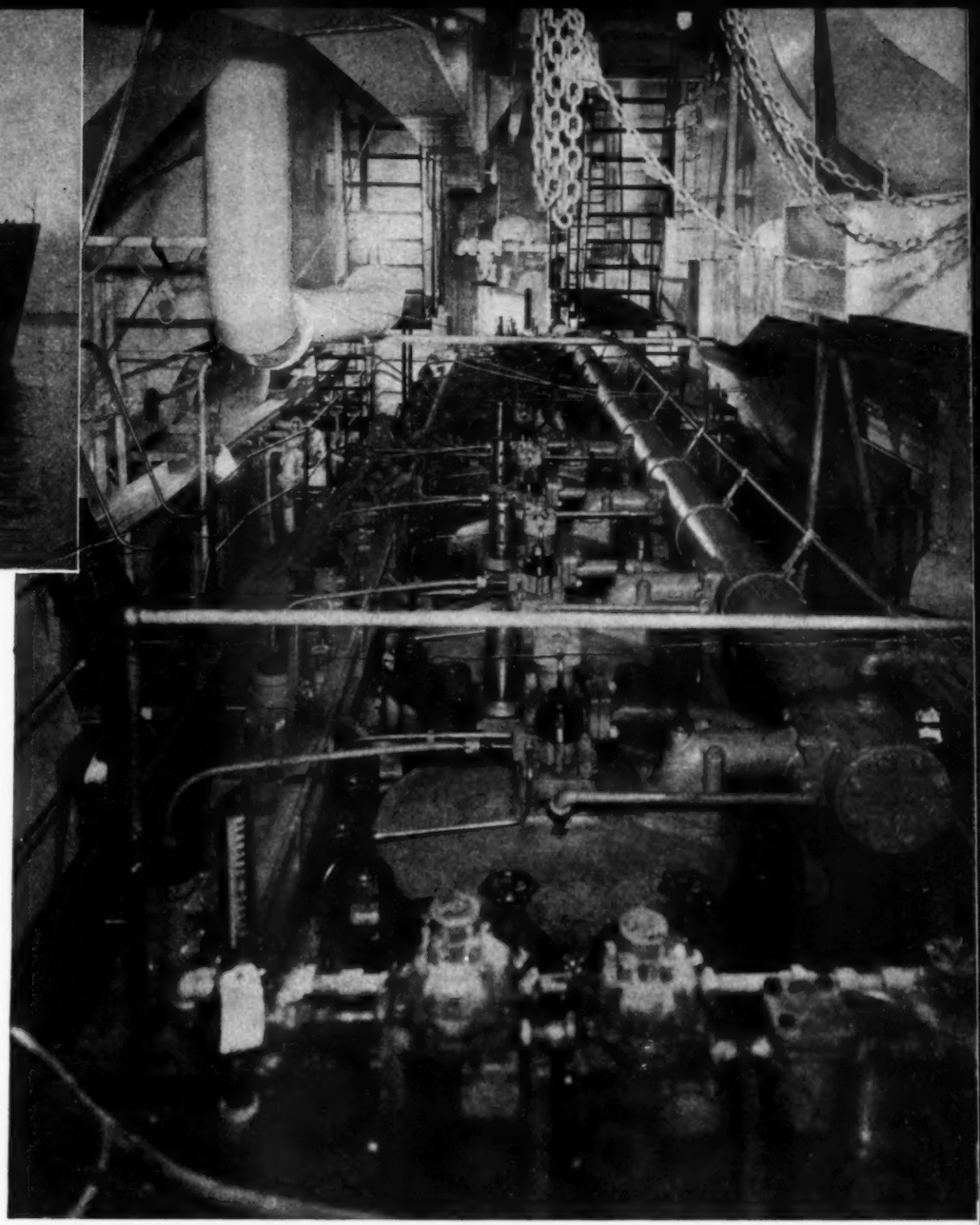
It was our privilege to be aboard the *Emory Victory* during the first day of her initial trial trip—a most pleasing experience due to her outstanding performance plus the unstinted hospitality of the Sun organization. Under the watchful eyes of Capt. C. Townsend, Master, and Capt. F. Campbell, pilot she was nosed away from the outfitting berth by three of Sun's veteran Diesel tugs with her big main Diesel in slow astern gently assisting. Then with her nose toward Delaware Breakwater she slowly gathered speed with increments of 10 rpm. at regular 30-minute intervals.

Then ensued a series of interest-absorbing maneuvering tests—all highlighted by the smooth responsiveness of her controls and ma-

chinery. The big Nordberg main Diesel went through its entire power range to a maximum of 6435 shp. without a perceptible critical and with noteworthy quietness. For example, the crash stop, always a thrilling point in trial runs, was achieved with a total absence of the "shuddering" of ship and machinery commonly experienced in this maneuver. The transition from full ahead to full astern was accomplished so smoothly that it was virtually impossible for the layman to detect the instant of reversal.

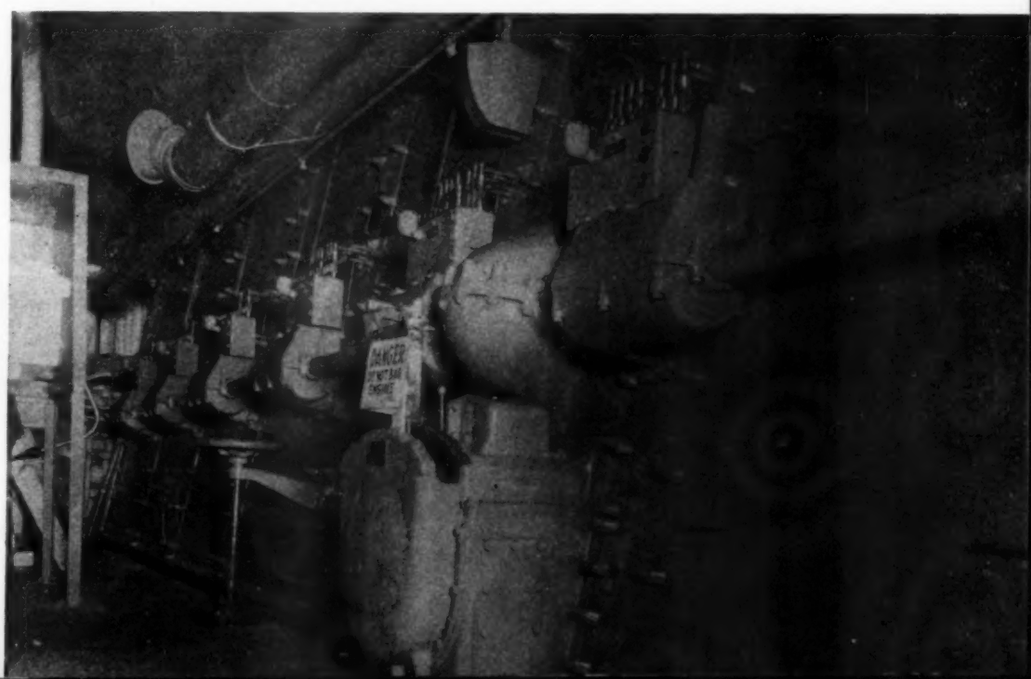
In the machinery space, midships, interest focuses on the propulsion engine—the 9-cylinder, 29 in. by 40 in., 2-cycle, single acting Nordberg, direct reversing Diesel, rated 5850 hp. at 160 rpm. Outwardly, this engine presents the clean lines and close attention to functional arrangement typical of Nordberg design. For instance, the overhead camshaft provides for placement of American-Bosch injection pumps close to each cylinder head with exceptionally short runs of fuel lines and the Woodward governor is placed atop and at the middle allowing the minimum of linkage. On the starboard side are two Elliott centrifugal scavenging blowers, of 15,000 cfm. capacity, operating at 3300 rpm. and driven by G.E. motors through step-up gears.

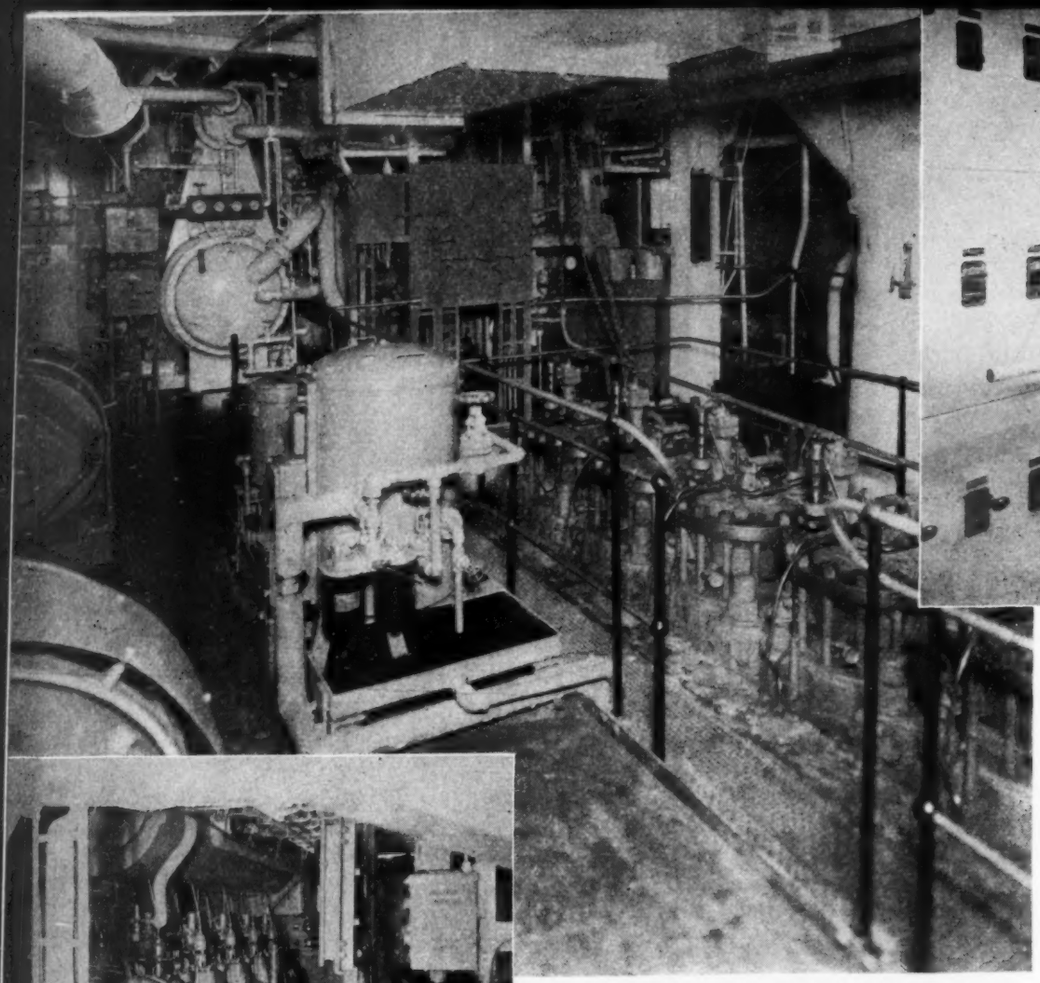
Flanking the main engine on each side are the two Nordberg auxiliary Diesels, each rated 1250 hp. at 257 rpm. These are 5-cylinder, 18 in. by 25 in., 2-cycle units with oil cooled, trunk-type pistons and fitted with Manzel lubricators, American-Bosch fuel injection pumps and Woodward governors. Each is direct connected to a G.E., marine type, 800 kw., 240 volt, 2-wire generator. An interesting feature of these generators is that they are designed for continuous operation up to 50% of load at 225 rpm., to permit lowering of engine speed thus reducing

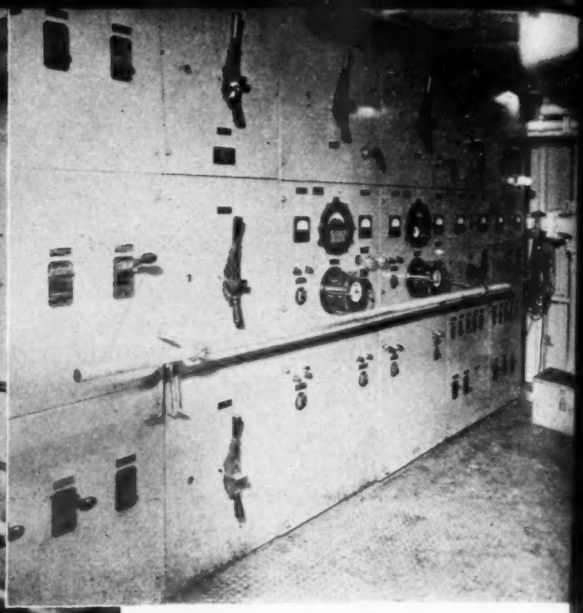


View, looking aft, over the top of the main engine—a 9-cylinder, 6000 hp. Nordberg single acting Diesel—the first of its kind ever built. American-Bosch fuel injection pumps are seen, left of cylinder heads.

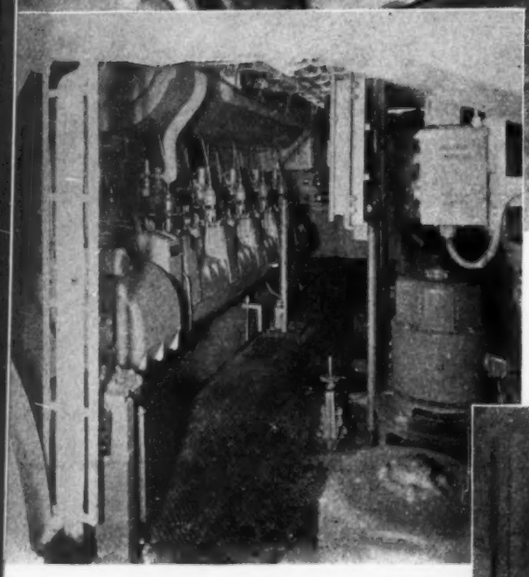
Port side of main engine showing operating station and Manzel lubricators.





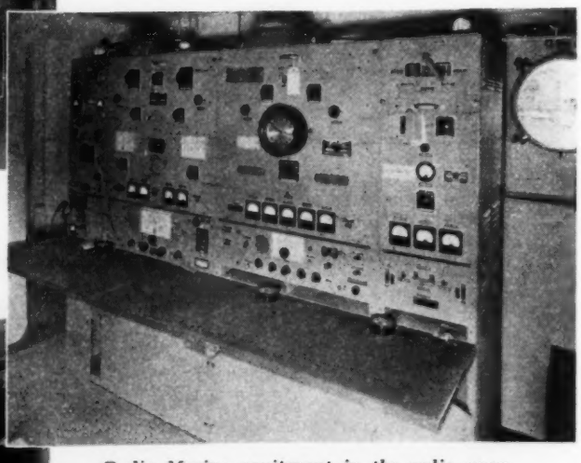


Partial view of the main control board.

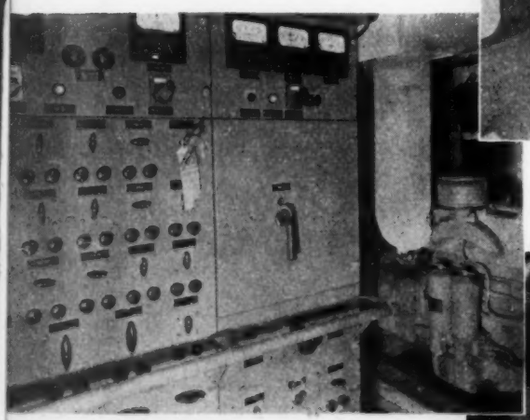


Operating side of Nordberg port auxiliary Diesel showing operator's station, American Bosch fuel injection pumps and Manzel lubricators.

... port auxiliary engine with fuel oil cleaning equipment, center, consisting of Purolator filters, Honan-Crane purifier and Commercial Fulflow duplex filters.

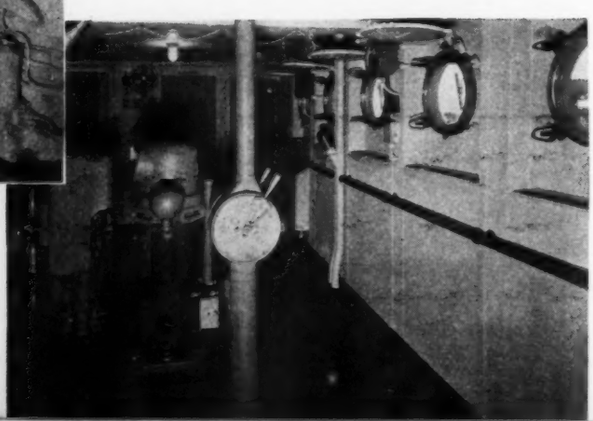


Radio Marine equipment in the radio room.



Caterpillar Diesel emergency generating set with automatic control board.

Right: Wheelhouse view showing engine room telegraph, binnacle and hydraulic steering unit.



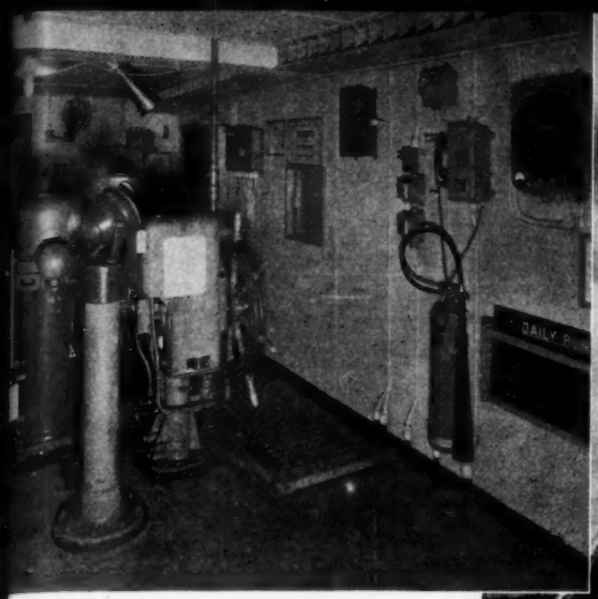
fuel and lube consumption, wear and tear. And to render this a completely Dieselized ship there is also a Caterpillar Diesel emergency generating unit fitted with an Automatic switch low voltage cut-in.

All three prime movers are designed to operate on heavy fuel of V550SSU at 100°F.; carbon 5% max.; sulphur 2% max., and flash point 150-250°F. Also common to all engines are Maxim intake and exhaust silencers, Alnor pyrometers, Electric tachometers, Struthers-Wells lube oil coolers and jacket water heat exchangers, Satco main and rod bearings, Erie Forge crankshafts, rods and camshafts.

Browsing through the machinery space we find many items essential to the performance of this impressive power plant, such as a pair of Ingersoll Rand, 2-stage, intercooled air compressors, rated 390 psi. and a single make-up compressor of the same make, all V-belt-driven by Allis-Chalmers motors and fitted with Air-Maze intake filters and U. S. gauges.

These units supply engine starting and manœuvering air. A De Laval centrifuge is provided for fuel oil treatment together with 2 combination clarification units comprised of Purolator duplex filters, Honan-Crane purifiers, Commercial Fulflow duplex filters and Ross heaters. Elliott discharge strainers and Hilliard purifiers are provided for lube oil treatment. Foster-Wheeler automatic oil-fired steam generating plant and waste heat boiler are fitted. Hotel hot water is supplied by 2 Taco heaters and a Ross booster heater.

Serving the power plant itself are Quimby fuel oil transfer and main engine booter pumps and a De Laval booter pump for auxiliary engines, also De Laval lube oil service pumps for all engines and a Gould plunger-type hand pump



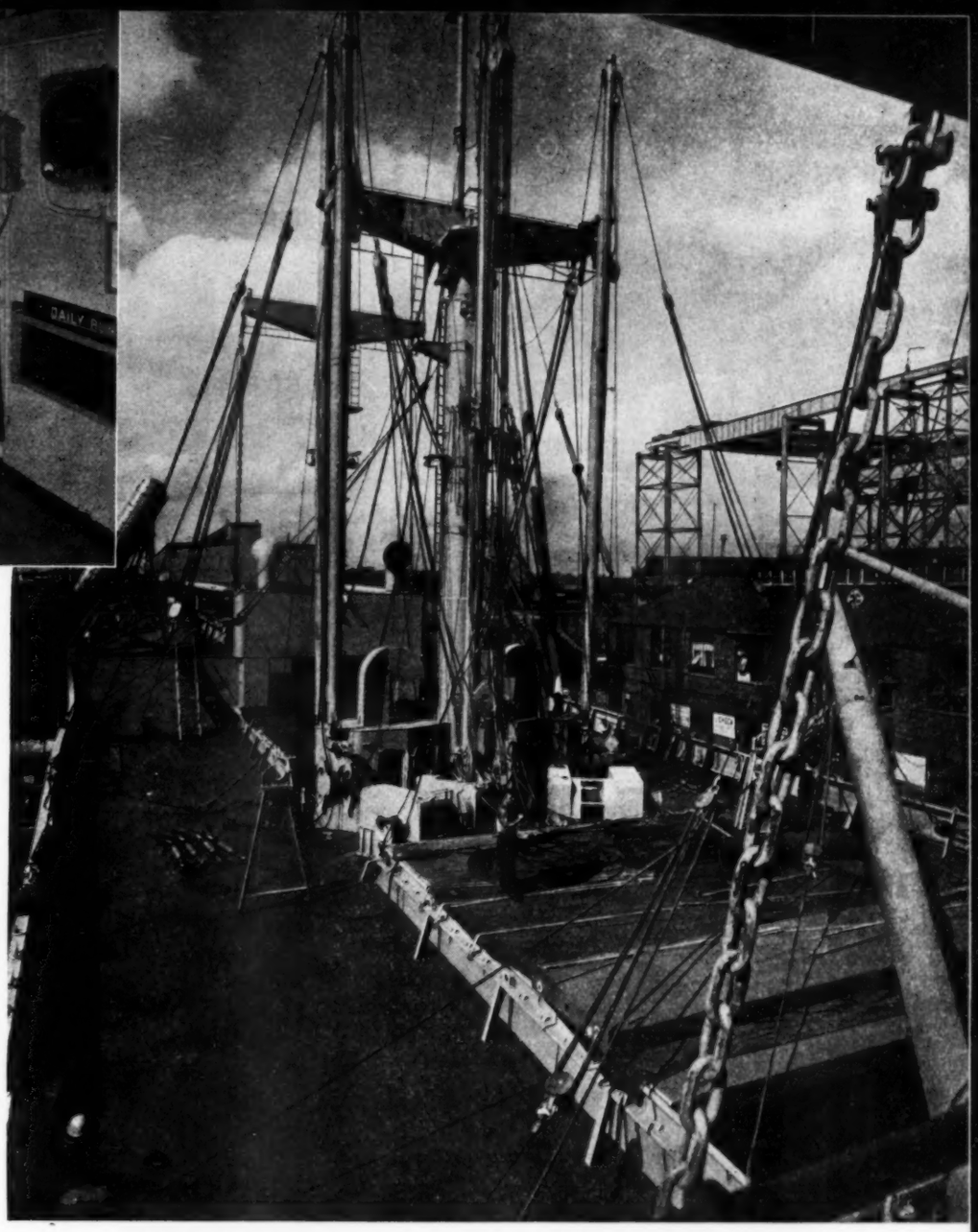
Wheelhouse view looking to starboard and aft bulkhead mounting ship's telephone and fathometer.

for lube oil stripping. Fresh and salt water circulating pumps for all engines are Allis-Chalmers centrifugals. We find also such operating essentials as Pneumericator tank gages and Taylor jacket water thermometers.

Freedom from all but essential operating and navigating necessities characterizes the wheelhouse where the Pilot Marine rudder angle indicator and Electric tachometer face the steersman, with Linonel binnacle on his right. Close by is also the Kidde Rich-Andio fire detector which is interconnected with all sections of the ship. Just aft the wheelhouse is the chart room fitted with Scott radio, Submarine Signal fathometer and Mackay Radio direction finder. The ship is of course fitted with a Sperry Gyro-compass.

All of these equipments and many more—each performing its function, go to make up this ship:—many are intricate and highly specialized machines and instruments—but all fit into a closely co-ordinated pattern which is the smooth dependable progress of the vessel under the will of its master.

Among those directly responsible and creditable for the inception, construction, and outstanding performance of the *Emory Victory*, who came aboard for the trial trip were Admiral H. L. Vickery, chairman, and S. R. Sanford, Director of Construction, U. S. Maritime Commission; Harvey Klemmer, Head, Post-War Planning Division; R. L. Burke, vice president, and G. McConechy, chief engineer, Sun Shipbuilding & Dry Dock Co.; George G. Sharp, naval architect; John Earl, Head, Diesel Section, U.S.M.C.; R. E. Friend, president; R. W. Bayerlein, manager, and E. Grieshaber, chief engineer, Nordberg Mfg. Co. Many other interested observers were present. All were most enthusiastic at the close of the first day's run.

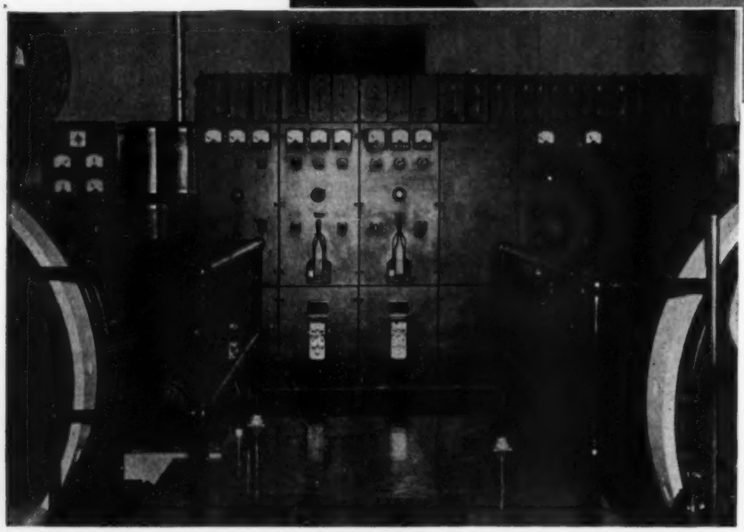


View looking forward over main deck from the bridge a few hours before trial run.

Main engine control panel with Alnor pyrometer and electric tachometer.

In this exterior view of the Woodbine, Iowa, plant are seen Burgess exhaust snubbers, extreme right.

DIESELS . . .



Six panel switchboard with G.E. instruments and voltage regulators.

AND EVERYTHING DOWN "IN BLACK AND WHITE"

Three F-M Diesel generating units totaling 750 h

By T. J. MALONE

CLASSES in the operation of municipally owned Diesel electric plants might well loo into the plant in Woodbine, Iowa, less tha four years old. This little town of 1,500, scar ly more than an hour from Council Bluffs, ha a spick-and-span layout of building and equi ment—everything new, everything tops. Pe formance bears out appearance.

Woodbine, plotted in 1865, is built on a le plain around an earth mound covering sever blocks. The town's water tower stands on th mound.

The municipal power plant replaced a priva utility's high-line service in operation twen five years. Three Diesel engines were installe two of 225 hp. each and one of 300 hp., su plied by Fairbanks, Morse, with alterna

and auxili

For three y service wer had been o of $.058 a commercial The munici year ended per cent lo years for th ation, the to lower than money at t by earnings.

Of the orig ment of $27 Of that $27 calling bond ing bond de intention is

and auxiliary equipment.

For three years and more before the municipal service went in, in August of 1941, the utility had been charging consumers an average rate of $.058 a kilowatt hour for residential and commercial lighting. That was the general rate. The municipal plant's average rate in the fiscal year ended March 31, 1945 was $.0373, or 35.7 per cent lower than the utility's. Averaged by years for the full term of the town plant's operation, the town's rate was $.0343, or 40 per cent lower than the utility's. The plant was making money at the lower rate too. It was putting by earnings. It was paying for itself.

Of the original bond debt of $115,000, payment of $27,000 has been made, with interest. Of that $27,000, all but $5,000 was paid by calling bonds before maturities. Of the remaining bond debt, $21,000 is in callables, and the intention is to take them up as soon as their terms permit. You pay debts before due only when you have the money. The plant had the money only because it had earned it.

Its surplus on March 31 last was $7,305.80, of which $1,500 (maturity value), was in war bonds. The total investment in the plant, including site, building, generating and other equipment, and distribution system, stood at $117,386, without depreciation.

Woodbine's power demand is a fairly even one, with no large industries to cause highly fluctuating loads. Industries using power include a seed corn processing plant, a lens grinding works for airplane radio services, a hatchery, two grain elevators, five cream stations and a locker plant.

A rural electric cooperative gets regular service from the municipal steam plant at Denison, Iowa, near Woodbine. Several times the Woodbine Diesel plant, having liberal reserve, has taken over when service from Denison was out temporarily. On one occasion a storm caused the cessation, on another work being done in the Denison plant required a shutdown. Against a rated 496 kilowatt capacity of Woodbine's three alternators, last year's peak load was 340 kilowatts.

With a few exceptions, light and power service in Woodbine is billed at regular rates for public as well as private use. Still, as a community enterprise, the plant makes some contributions of service. Street lighting, under the town council, is billed on a basis of $83.33 a month, and any excess cost over that is absorbed by the plant. Last year the excess was $1,425. The athletic field has floodlights for night football and a flat charge is made, but the plant absorbs any excess in actual cost.

Woodbine for years has observed an annual "Play Day," usually in August, a rousing all-age, town-and-country get-together, when everybody knocks off work, dons the Sunday clothes and goes in for a good time generally. The Commercial Club, the American Legion Post and other agencies plan the program of events. A feature of the day is an elaborate horse show, to which farmers for miles around bring their choice animals. This year a baby beef exhibit will be included. The municipal plant's personnel puts up special lighting and equipment for a carnival, community singing and the like. Current is furnished free, but the Play Day committee pays for the crew's labor.

Yardsticks in this table tell the story of the municipal plant's performance:

Fiscal year	Kwh. generated	Kwh. per gallon of fuel oil	Av. kwh. cost del'd to consumer	Av. kwh. sale price
1941-1942	356,800	11.85	$.0159	$.0323
43	771,940	12.2	.0148	.0333
44	879,860	12.55	.0151	.0344
45	884,750	13.01	.0153	.0373

Consumer rates in Woodbine have not been changed since operation of the plant began. The residential and commercial rates are presented in the following table along with corresponding rates charged by the private utility from April 1, 1938, to the time the municipal plant took over:

Residential

Municipal	Private Utility
First 30 kwh. at 8c	Minimum monthly bill (Inc. 8 kwh.) $1.00
Next 20 kwh. at 5c	Next 17 kwh. at 8½c
Next 150 kwh. at 2½c	Next 25 kwh. at 5c
Excess at 2c	Next 150 kwh. at 2½c
	Excess at 2c

Commercial

First 60 kwh. at 8c	Minimum monthly bill (Inc. 8 kwh.) $1.00
Next 40 kwh. at 5c	Next 42 kwh. at 8½c
Next 400 kwh. at 2½c	Next 50 kwh. at 5c
Excess at 5c	Next 400 kwh. at 3c
	Next 4500 kwh. at 2½c
	Excess at 2c

The Woodbine schedule includes a power rate as follows: first 200 kwh., 4c; next 800 kwh., 3c; next 3,500 kwh., 2½c; next 6,000 kwh., 2c; excess 1¾c. The private utility offered no special power rate.

Members of the Board of Trustees of the municipal plant are C. J. Stephany, Arthur Turner and Lynn Powley. The first two have served from the beginning. O. M. Dean is superintendent of the plant and secretary of the board.

A visitor to the plant will see engines, alternators, and auxiliaries glistening in coats of shiny black enamel, in contrast to the usual gun metal, lightened by touches of white. The rims of the fly wheels are white, three-inch bands of white circle the cylinder heads, white border-rings adorn the inspection plates, all oil and fuel lines, starting air valves, water valves, bridge rails, are in white. The engine-room floor, of concrete, is painted in two tones of gray, and then waxed. Painting is done every year at the time of the inspection of the engines, as a part of good housekeeping practice. Not only the complete record of plant operation but the equipment itself is down "in black and white."

DIESEL TRUCKS PROVE IN FOR SHORT HAULS

By L. M. BARTON•

THE finest and most substantial tribute ever paid to the automotive Diesel engine is the statement just recently released by the California State Board of Equalization, the state's fuel tax collection agency, to the effect that California's 3c per gallon tax on Diesel fuel for highway use for the first six months of 1945 gained 18% over the same period of 1944. Notable among other facts given by the Board is the growth of registrations of Diesel trucks and busses which, by the end of the first quarter of 1945, had risen from 4,683 individual units in 1944 to 5,713, or a gain of 22%.

The significance of these facts is all the more marked when it is taken into consideration that the increase in Diesel truck registrations represents principally the power unit—a single truck or a tractor—and does not embrace the cargo carrying capacities of huge trailers, or semis and trailers, which extend the length of each complete operating unit to California's legal length of 60 feet. Trailers are of course registered without any regard to whether they are pulled by Diesel or gasoline power. But probably 90% of the long life of a Diesel tractor or truck is spent hauling a load twice its own rated capacity in tonnage.

The increase in Diesel-moved tonnage in California has now reached staggering figures and invites a close study to discover what has happened to cause this increase, or contribute largely to it, and whether the experience of California's trucking industry contributes something new and unique to the industry in other states, where Diesels are less used.

Those of us who are interested solely in the wider application of the economy of operation and maintenance of Diesels are more interested in facts than in theories, for facts are indisputable.

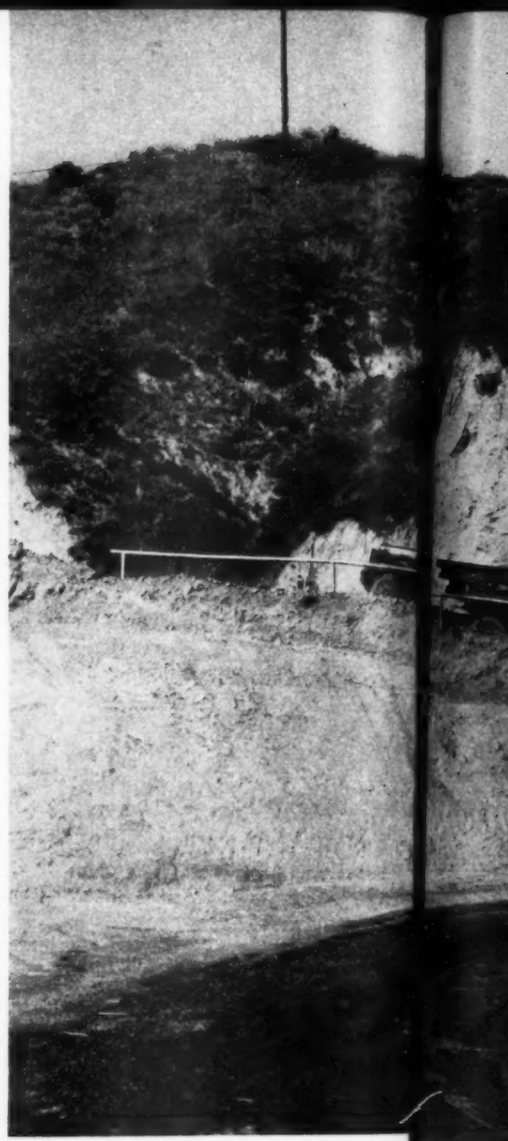
The growth of the automotive Diesel in California furnishes only a general picture, but when you engage in a study of a specific, outstanding operation it is then possible to determine whether the results are profitable or unprofitable, practical or impractical, and also whether a new trend in Diesel transportation is being developed.

California's Truck Registration Records disclose that within recent months there have been many new entries into the field of Diesel transportation but one of the most conspicuous developments any investigation could reveal should come from the experience of the Paxton Truck Company of Los Angeles which has just completed the registration of 16 heavy duty, Cummins Diesel Peterbilt truck and tractor chasses and has increased its truck terminals from one to four—all located within a radius of 110 miles of the home terminal.

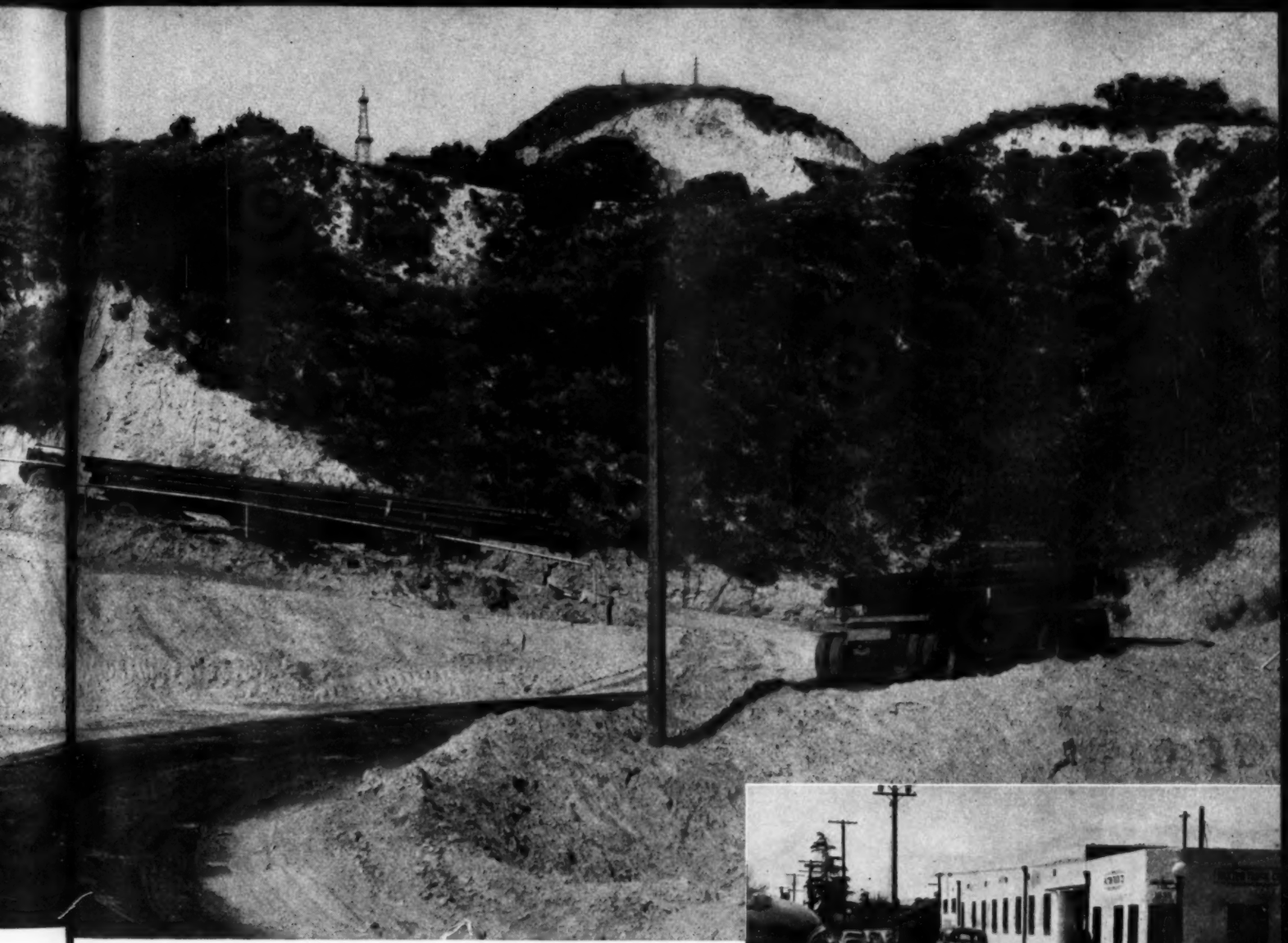
Familiarly known as "Art" to his intimate friends and associates Mr. Paxton began writing motor trucking history in Southern California back in 1922 when he drove his first gasoline powered truck himself. Now the owner and operator of four truck terminals, Mr. Paxton has given unselfishly of his time and experience to the industry, serving as President and a Director of the Southern California Trucking Association, also as a Vice President and Director of the American Trucking Association, as well as being active in the formation of Transport Clearings Inc., which has remarkably simplified the process of making collections of freight charges from shippers and relieved the trucking industry of much of its credit responsibilities—a plan welcomed by both large and small shippers. But let Mr. Paxton relate his own facts.

"Our Diesel experience began only five years ago—in 1940—when we put the numerals 40 on a 1925 Mack truck powered by a four cylinder Cummins Diesel, which we bought as an experiment from one of California's pioneer truck operators—and old No. 40 is still a member of our fleet in its 20th year of service," Mr. Paxton began.

"The first mechanical change we made was to replace the 4 cylinder engine with a 6 cylinder Cummins Diesel and since then we have learned much and profited by all of it. You must remember that our business is comprised very largely of the transportation of heavy cargoes, sometimes running as much as 30 tons in a single movement, and requiring special highway permits and routings, as well as equipment adapted to the hauling and handling of every type of steel and all of the heavy materials used in the drilling, operation and maintenance of wells in the California oil fields. As a matter of fact we are called upon to transport practically anything that can be moved by the railroads and frequently move cargoes that even the railroads cannot handle. Notable among such instances have been the jobs we have been called upon to do for the steel fabricators and shipyards in the handling of ship masts measuring as much as 100 feet in length, with cross arms 20 feet long and weighing upwards of 20 tons; complete 60 foot boats for the Navy and many other cargoes too wide and too high for rail transportation. These heavy hauling



• *As related by "Art" Paxton of the Paxton Truck Company, Los Angeles, California.*



Here are seen two of Paxton's fleet of 16 heavy duty Cummins Diesel Peterbilt track tractors negotiating steep grades and sharp turns with pipe for the oil fields.

Office building at the home terminal of Paxton Truck Company, Los Angeles.

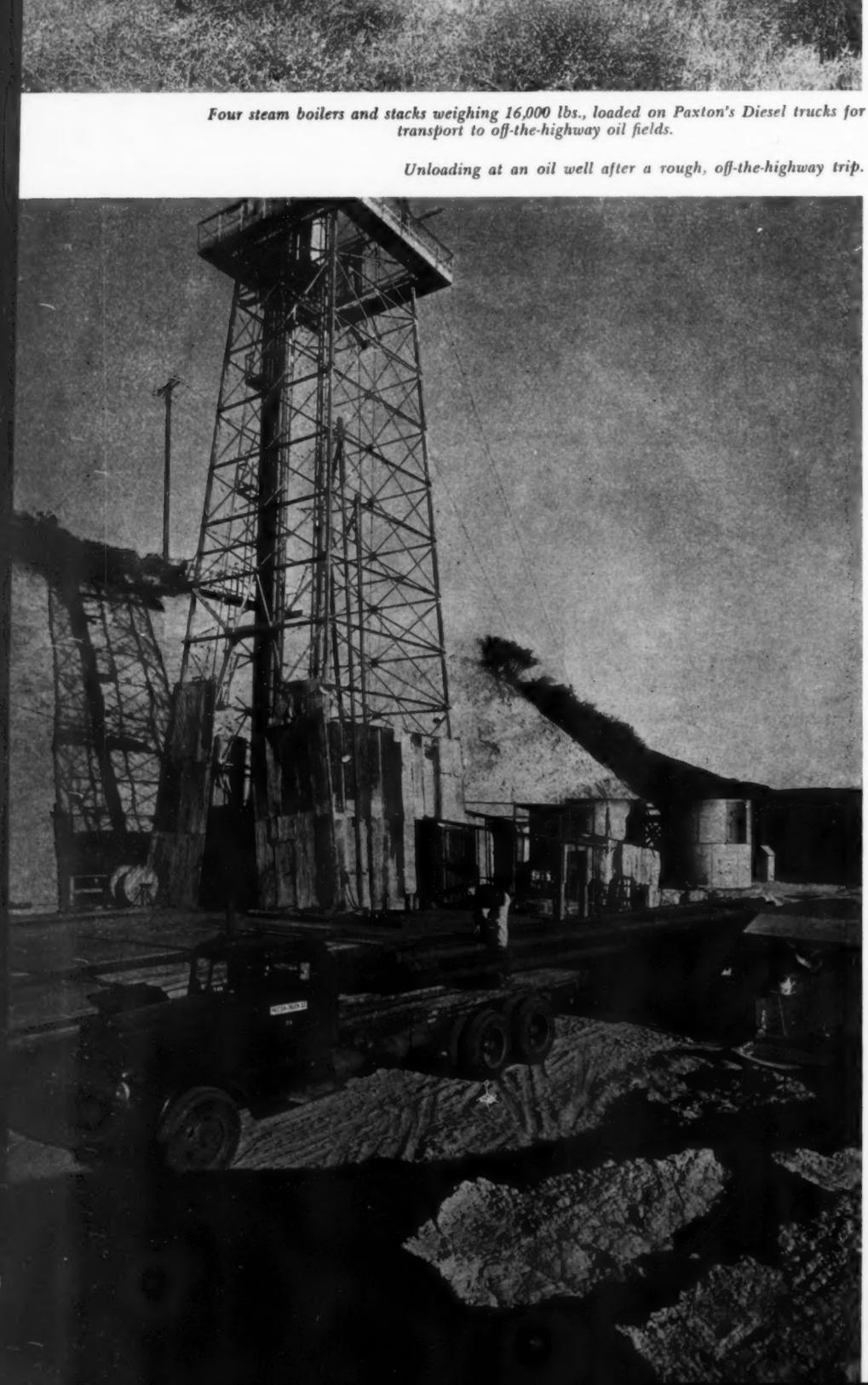
jobs can only be done by securing special highway permits, and in most instances with a motorcycle police escort.

"Naturally, the promised economy of Diesel operation and maintenance and its continued proof have been the greatest factors in our swing to Diesels. There is not the slightest question about this. Our business has never been one that has depended upon long distance hauling. By this I mean a steady succession of hauls over such distances as the 450 miles between Los Angeles and San Francisco, although we often do have such shipments. But I believe that in our early Diesel experience it was the long haul that convinced us of the ultimate economy of Diesels.

"Undoubtedly one of the most important factors that has influenced our expansion of the use of Diesels is the need for surplus, flexible power which is not only required in the movement of heavy cargoes, but in the loading and unloading which require that we add considerable in necessary equipment to the bare truck chassis. Our trucks and trailers must be versatile—able to handle every type of job and tonnage, and our dispatchers must be sufficiently familiar with every type of load to know what kind of equipment to send out on the job. All of our special equipment weighs heavily. Loads of long sections of oil field drilling equipment and pipe always require heavy bolsters on both truck and trailer to enable the load to make sharp and reverse turns on mountainous unpaved roads, or virgin trails. Long, heavy structural steel and concrete reinforcing rods usually require bolsters and often the use of a one or two axle dolly. Every Cummins Diesel engined truck we operate carries a permanent installation of a heavy power winch driven through a power take-off from the main transmission. To all this weight must be added heavy chains and timber for blocking and tying down the cargo, or pipe stakes or side racks. By the time we get ready to do a job we have probably added as much weight as 2 to 3 tons in special equipment to the truck manufacturer's chassis. All of this, plus a heavy load, requires power—economical, flexible power

Four steam boilers and stacks weighing 16,000 lbs., loaded on Paxton's Diesel trucks for transport to off-the-highway oil fields.

Unloading at an oil well after a rough, off-the-highway trip.



which the Diesel engine gives us.

"Until we added the 16 heavy duty Cummins powered Peterbilts to our fleet, the necessity for multiplying the brute power of the Diesel engine was so imperative that we and all users of similar equipment here in Southern California found it necessary to add an auxiliary "brownie" transmission, after we bought our equipment from the truck manufacturer to give us even greater horsepower through a wide selection of low gear ratios. Our new Peterbilts come off the production line with this equipment, plus the companion power feature of the new heavy dual drive rear axles by Timken. This latter feature is very essential to our use because our oil field work takes us, much of the time, into uninhabited sections where no kind of highway or even a trail exists and where the traction of the dual drive is essential in negotiating the rugged terrain of the oil fields and in climbing as much as 20% grades.

"We have always been open minded to suggestions for the improvement of our Diesel operations and the reduction of costs. After five years of Diesel operating experience our records prove that our use of Diesels has reduced our operating and maintenance costs as much as 40%. This is confirmed by the specific instance when two of our trucks and trailers—one with Cummins Diesel and the other with gasoline power—each made a 20 ton pay load haul between Los Angeles and San Francisco. The units left our Los Angeles terminal with 120 gallons of Diesel fuel and 100 gallons of gasoline respectively. At the end of their round trip the Diesel driver had spent $8 for fuel. The driver of the gasoline powered unit had spent $58 for gasoline. Both covered the same distance. It doesn't require any mathematical genius to judge which was the most advantageous operation to us.

"In these five years of Diesel operations we have learned many things, including the elimination of heavy, black exhaust smoke through having the conventional Diesel fuel re-refined to give us a clear, clean fuel, free from sludge and corrosive acid, with a Cetane Number of 50 or better, and a generous increase in Btu's per gallon which is the real source of power in any kind of fuel. Incidentally this re-refining of our Diesel fuel results in the removal of as much as 16 pounds of sludge, gums, tars and resins from every 100 gallons of fuel, and frees us from the crankcase sludge nuisance. This, too, eliminates costly, bothersome fuel pump difficulties, and while we first reduced the cleaning of fuel injectors to three and four

month periods, we have now reached the point where we have completely eliminated the clogging of fuel injector nozzles for we have not experienced this difficulty for many months. We are also obtaining better fuel mileage and average not less than 5½ miles per gallon.

"I have always encouraged the development of new ideas within our organization to increase the efficiency of our equipment. A notable example is the recently perfected air clutch control designed by our maintenance engineer, Harvey Klopfenstein. This air control enables the driver of the truck to release or engage the engine clutch for winch operations without leaving the winch platform and gives him a precise, flexible control of his winch operations at all times. All of our Diesel trucks are equipped with these power winches and air controls.

"If we have established any innovations or disproved old fashioned theories in our use of automotive Diesels—or if we have proved that Diesel is as practical for the short haul as it is for the long haul, we have only followed the dictates of necessity and the balance sheet. Several years ago we made a very careful study of individual job-distances and found that the average haul was 100 miles. More recently this average has been reduced to 75 miles. But this is not all. In some instances our Diesel equipment travels as little as one or two city blocks and this happens particularly in the unloading of heavy materials from railroad cars and moving them into the consignee's plant. We have deliberately done everything possible to reduce our mileage per haul, and with this end in view we now have four separate terminals from which as many sections of our fleet operates. The long haul, you know, isn't always the most profitable.

"Establishing our terminals at strategic points, with 110 miles between the two most distant points, has been done with the primary objective of giving our patrons prompt, efficient service, and also to enable us to take the maximum advantage of back-hauls. In addition to our main terminal in Los Angeles we maintain a fleet permanently at the Vernon (Los Angeles) plant of the Bethlehem Steel Company where we have our own servicing and fueling facilities—not more than 5 miles from the home terminal.

"Our third terminal is located at the Fontana plant of the Henry Kaiser steel interests, approximately 50 miles east of Los Angeles, and now we have added the Bakersfield, California, 110 miles north of Los Angeles which not only serves as the base for our fleet of Cummins Diesels that works in the adjacent oil fields but is also a check-in or transfer point for trucks from the other terminals.

"Our terminals are all connected either by telephone or teletype and the chief dispatcher at each point is always familiar with the movements of the entire fleet and is thereby able to arrange back hauls for equipment that would otherwise return to its home terminal empty. Wartime conditions, of course, intensified the development of this type of business, in the efforts of the trucking industry to conserve both fuel and tires.

"Where the short haul is of decided advantage to the trucking business, and in our business in particular, is the promptness with which our maintenance department can make service calls —and the shorter the haul, the earlier our mechanics can arrive on the scene. Not all service calls are purely mechanical difficulties for the very nature of our work, in operating over the rugged country where highways have never existed, sometimes results in unavoidable accidents where the equipment must be replaced temporarily. As a matter of fact the majority of our service calls during the past several years have been due to tire failures.

"It would be a mistake to judge that our type of heavy transportation is in competition with the railroads. On many of our hauls the driver either never sees a railroad, or both the point where he loads his cargo and the point where he delivers it lie in remote locations not served by railroads. A case in point is that of an oil field steam power plant that weighed 63,200 pounds. It had to be moved within 12 hours from one oil field location not served by a railroad, to another oil field location, also not served by a railroad—a distance of 275 miles—within 10 hours. This movement required the use of one of our specially built, heavy duty, low bed semis using 12 huge tires, with the tractor having 10 more tires. This movement could have been partially made by rail but this would have involved loading the steam power plant on our low bed semi at the well where it was in service—transporting it to the nearest rail point and then reloading on a rail car. At the end of its rail haul the plant would then need to be unloaded on to a low bed semi and delivered to its final destination and set on its new oil well base location. Such a movement would be prohibitive in cost as well as prohibitive in the amount of time consumed.

"Another very apt illustration was the recent movement of four new steam boiler installations to a remote location in the oil fields. These boilers were more bulky than weighty for they only weighed 16,000 pounds each, but each one required one of our Cummins Diesel tractors and semis and all were moved simultaneously. This haul was comparatively short but could not possibly have been made by rail.

"Old No. 40, the 1925 Cummins Mack truck that introduced Diesel to our fleet is now in its 20th year of service and while it doesn't bear much resemblance to the day it came off the production line, I venture to say that it will continue to be an active member of our fleet for—I don't know how many more years. Nothing discloses its age but the old open cab and the protruding front end where it was necessary to lengthen the frame to replace the old 4 cylinder Cummins with a new 6 cylinder Cummins, and that was done 5 years ago."

Mr. Paxton's story is revealing in that it indicates the successful application of Diesel automotive engines to the short haul in heavy duty transportation, and in this respect the Paxton operation should have counterparts in many sections of the country. Preliminary reports of the performance of the new 275 hp. dual valve, supercharged Cummins Diesel engine in competition with a 300 horsepower six cylinder gasoline engine in identical truck units disclose that the Cummins mileage per gallon on .06c fuel is at least twice the mileage of the gasoline engine operating on fuel that costs 20c per gallon, with gasoline power having no advantage in the matter of speed.

These Peterbilt, Cummins Diesel-engined tractors go where there are no railroads and often no highways.

Owner-Skipper, Captain Hans Akse

"SOGN"

ALL-PURPOSE DIESEL FISHER

By CHARLES F. A. MANN

NAMED for the largest Norwegian Fjord, the trim, rather nifty combination fishing vessel *Sogn* completed in August at Tacoma Boatbuilding Co., Tacoma, Wash., marks a definite trend along the North Pacific for an all-purpose fishing vessel type that can fish for anything that is profitable, any season of the year; operate more economically and at higher speeds than any previous type of North Pacific Coast fishing vessel.

And of course a trim Diesel engine does the work below decks—in this case, another "Diesel First" as well as another "Marine First" for Tacoma and the rest of the Coast—it carries the first 8-cylinder 250 hp. Hendy Diesel ever installed in a fishing vessel. The particularly interesting feature of this Hendy Diesel installation is that it is a compact, fully enclosed, low headroom 8 cylinder, 4 cycle job, turning up 900 rpm., and driving a 3 bladed 64 x 46 in. Doran propeller through a Twin Disc 3 to 1 reduction gear.

Sogn (produced "Sonn") is owned by Captain Hans Akse of Seattle, dynamic Norse fisherman who can sniff a school of fish 15 knots away or 150 fathoms down. Captain Akse took the wheel on the trial voyage Downsound from Tacoma to Seattle, after Builder Arne Strom, co-partner of Tacoma Boatbuilding Co., performed his unvarying ritual for trial trips of commercial, pleasure, Navy or Army vessels built at his busy yard—the 20-30 maneuvering tests while getting away from the outfitting dock, just to deliberately run his vessel out of starting air or catch a fluke in the Diesel controls; then on down City Waterway for a race with the Coast Guard patrol boat, cameraman aboard, and off up to the Official Navy measured mile on Vashon Island. . . . When Captain Akse took over, he began celebrating a novel event in fishing vessel operation—his husky little ship did almost twelve knots with its 250 hp. Diesel turning about 820 rpm. It must be kept in mind that all purse seiner types carry heavily flared hulls forward and their Diesels directly under the pilot house—which makes most of them, even with 600 hp., pretty close in the 11 knot speed class. . . . You can get just so much speed in a ship of this unique design. They say that Captain Akse was still puffing out his chest when the ship reached Astoria, in a fast, 27 hour run from Seattle without a mishap.

Sogn is 70 x 18 x 8.75 and 7 ft. loaded draft, and is rated at 73 gross tons. It carries a crew of 9 in roomy conventional quarters on the main deck, replete with mahogany trim, reading lamps in the berths; spring mattresses and good plumbing and locker facilities, plus the captain's stateroom aft of the pilot house, where he has a nice little desk, an Intervox 2-way 65 watt radio phone and an Intervox direction finder.

The Hendy Diesel carries an Alnor pyrometer, Ross heat exchangers for both fuel and lube and is 100% fresh water cooled. An air compressor and small generator operate off the main Hendy Diesel, as well as the lineshaft drive for the windlass and anchor winch. Bendix Scintilla fuel injection is featured on the Hendy Diesel; bronze tailshafting; and Fram oil filters as well as a Weston tachometer and controls extended to both the inside and outside pilot house. A small duplicate instrument panel, with lube oil, air gauge, Weston tachometer, etc., is also fitted in the indoor pilot house. A bronze steering wheel and engine speed and reverse control wheel is fitted outside and in front of the pilot house, behind a curved glass windshield, for spotting fish, making quick maneuvers, etc., while at sea.

The lineshaft drive off the main engine, an innovation peculiar to Puget Sound fishing vessels, will operate a husky Northern dragger, unique invention of Tacoma Boatbuilding Co., that permits rapid change from trolling, dragging for trawl fish; halibut, salmon and herring purse seining, fishing for Pilchards and without using it at all, and substituting a bait box for the net turntable on the after deck, the whole ship can be quickly converted to a nifty tuna clipper.

Arne Strom, co-partner Tacoma Boatbuilding Co.

In fact Capt. Akse took the *Sogn* directly to Astoria, Ore., to fish for the magnificent white Albacore tuna off Astoria, first, the finest, highest priced tuna, and his ship sailed equipped with galvanized racks for the men to work from off the stern. After the North Coast tuna season is over, Capt. Akse will install a Northern dragger and connect up to the lineshaft drive which runs directly underneath the main deck framing, and remove the big ice-bait box aft and put on a net turntable, and go herring, pilchard and perhaps salmon seining this winter. You cannot do this with the "giant type" ship—it either is a tuna boat or a seiner. But you can with an all-purpose fishing vessel like *Sogn*. You can also go fishing for the vitamin A filled, fabulously priced shark livers, with *Sogn*, which the captain also plans to do. So naturally the machinery layout had to be good. With a cost of over $65,000, the *Sogn* represents the life savings of its owner. So the machinery cannot fail.

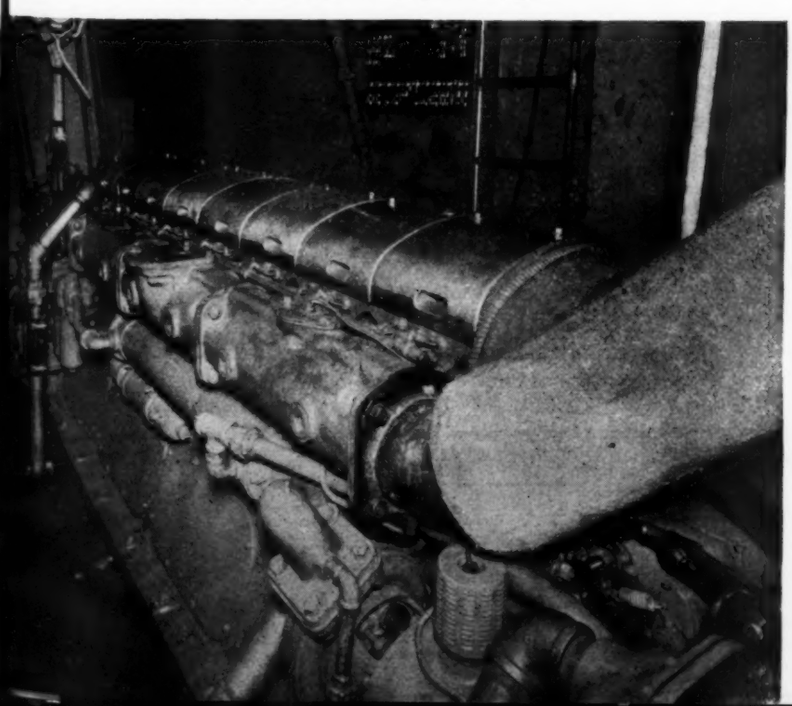
Auxiliary power is produced by a compact 3 cylinder 24 hp. Sheppard Diesel marine auxiliary set. Through pulleys and belt drives it drives a 2-cylinder Quincy compressor; a 3 kw. Imperial electric generator and a 5 x 6 in. De Laval bait pump. The main engine turns the 2½ x 2 Marine Products (Detroit, Mich.) fire and bilge pump through a V belt drive. A 110 volt Willard battery set is fitted for both generators.

Tank capacity is 4,000 gallons of fuel oil; 100 gallons of lube oil and 750 gallons of fresh water. A Frigidaire set in the engine room cools and freezes the combination galley box.

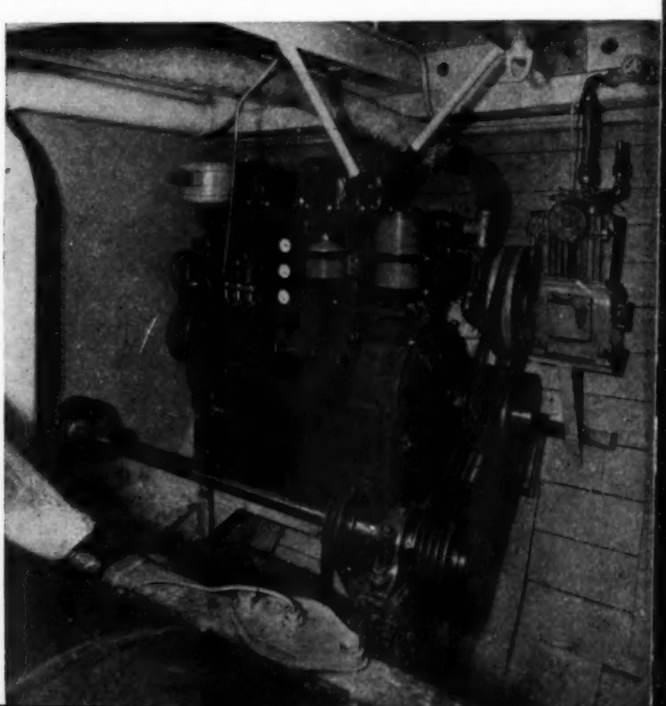
Sogn's behavior will be observed by every Nordic fisherman on the Pacific Coast.

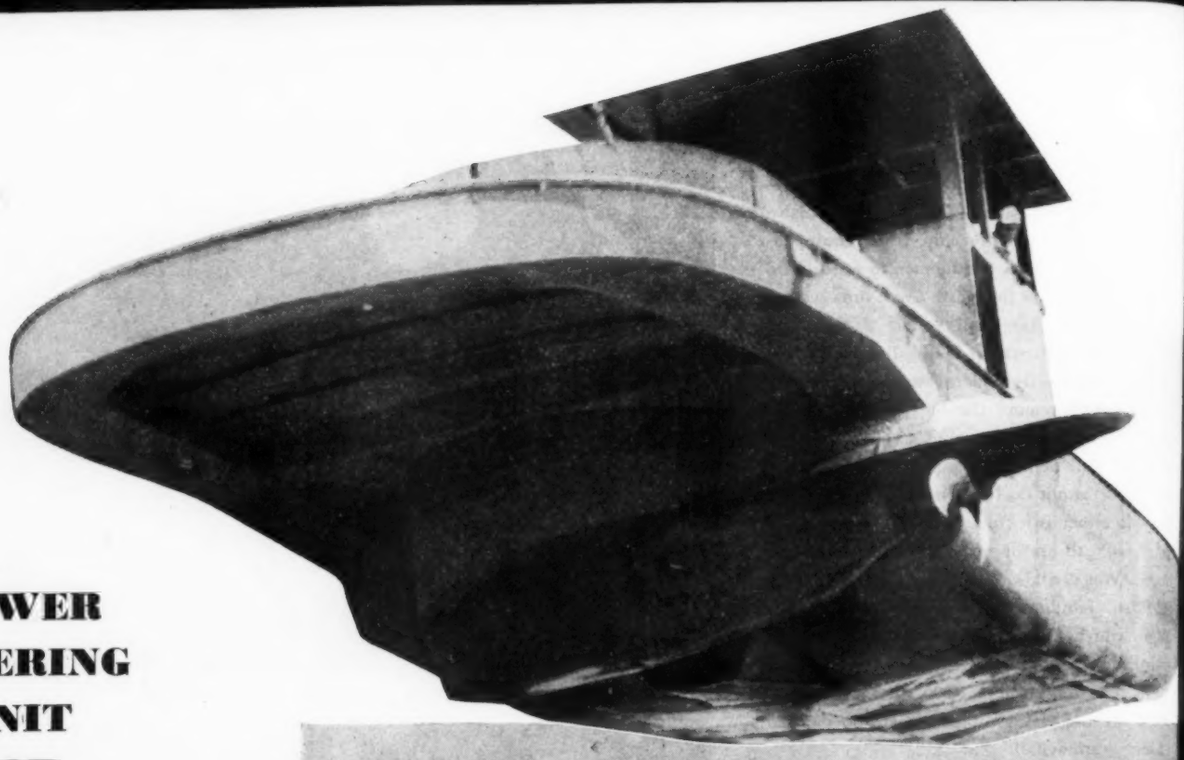
On trial run in Commencement Bay the "Sogn" did 12 knots.

The 250 hp. Hendy Diesel propulsion engine.



Sheppard auxiliary Diesel with Fram oil filters and Quincy compressor.





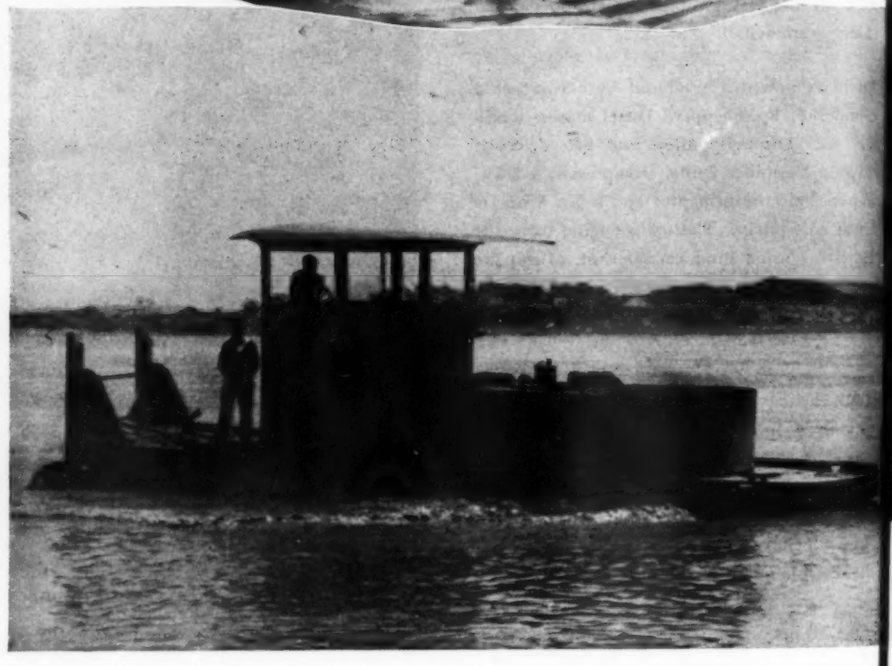
POWER STEERING UNIT FOR TOWBOATS

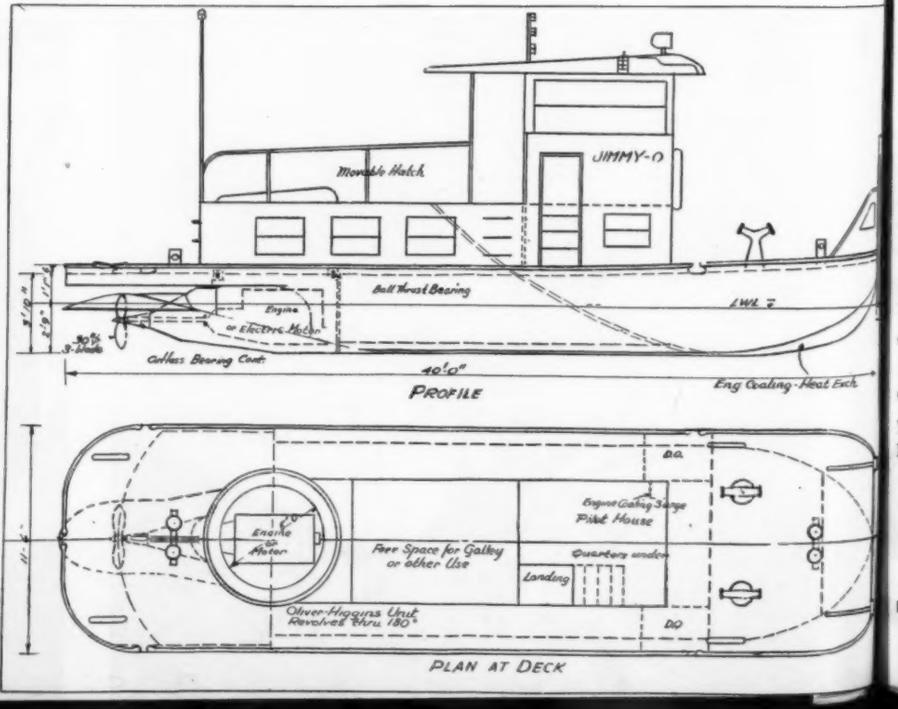
KNOWN as the Oliver-Higgins Unit, a new device for towboat propulsion has been developed at the Leavenworth Shipyard of the Missouri Valley Bridge & Iron Company. Without the use of an outboard mechanism, the advantage claimed for this unit is that it makes available 100% of the propelling power for flanking or steering instead of the 15% to 40% ordinarily available on a screw propelled boat.

The unit consists of an engine, shaft, and propeller mounted in an element which rotates through 180 degrees. Using a reverse gear renders 100% steering power available in any direction. River men said, "We always wanted a towboat that would give us a 'hit-a-lick sideways'—and we sure have one now," after seeing the converted "Jimmy-O" perform.

The unit is not limited to the small high-speed Diesel because with Diesel-electric type of drive the unit itself would contain only the propulsion motor thus permitting installations up to 1000 hp. And with the use of multiple screws, units of 2000 or more hp. are visualized.

Responsible for this interesting development are J. V. Oliver, superintendent, and Walter F. Higgins, foreman, at the Leavenworth Shipyard. Company officials have cooperated liberally, making various yard services available. A bright future should be in store for the Oliver-Higgins unit, answering, as it does, the long-felt needs of towboat service.





Top View: Underside of the "Jimmy-O," showing the power steering unit in beamwise position.

Center: The towboat in a flanking maneuver on a radius equal to its own length.

Right: Profile and plan showing simple arrangement of the power unit.

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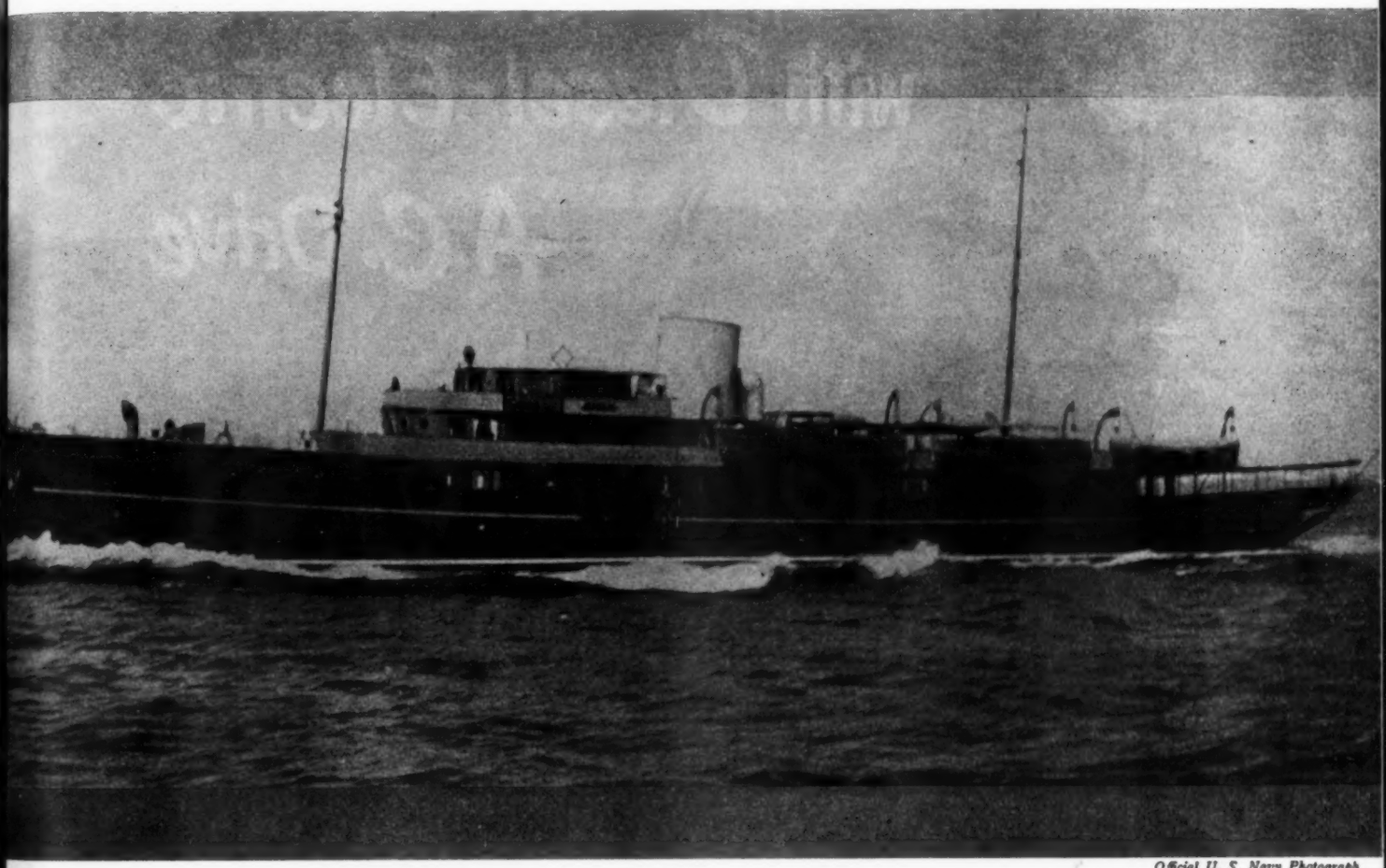

Official U. S. Navy Photograph

U.S.S. Williamsburg—Yacht of the President of the United States.

Becomes Presidential Yacht

By WILLIAM J. MADDOX*

THE new presidential yacht *U.S.S. Williamsburg*, as a fast gunboat powered with two Model 157-A Winton Diesels, served on high speed convoy duty during the war, and while in service as flagship she was active in convoy and control work en route to and in the vicinity of Iceland. She replaces the Potomac which was condemned as unseaworthy, and underwent extensive overhauling at the Norfolk Navy Yard before recommissioning for White House duty.

Originally named the *Aras*, the new presidential yacht was built by the Bath Iron Works, Bath, Maine, in 1931 for U. J. Chisholm of New York City. She was designed for ocean travel as an ocean yacht, with an overall length of 243 feet 9 inches, extreme beam of 36 feet and full load displacement of 1,900 tons.

She was purchased by the Navy in 1941 and converted into a gunboat, with the addition of armament and other equipment necessary to fit her for Naval service.

The *Williamsburg's* first duty was as flagship for the commandant of the Naval Operating Base, Iceland, the latter part of 1941. In February 1943 she was assigned as the flagship of the Commander, Fleet Operational Training Command, Atlantic Fleet. Last June she was ordered converted into an administrative flagship.

As reconverted at the Norfolk Navy Yard preparatory to going on duty for the White House, the *Williamsburg* was equipped with four guest staterooms, two baths and an office and bedroom with bath for the President. Accommodation also are provided for the ship's officers and crew and Secret Service personnel. She is equipped, too, with the latest communication facilities so the President can be in touch with the White House at all times.

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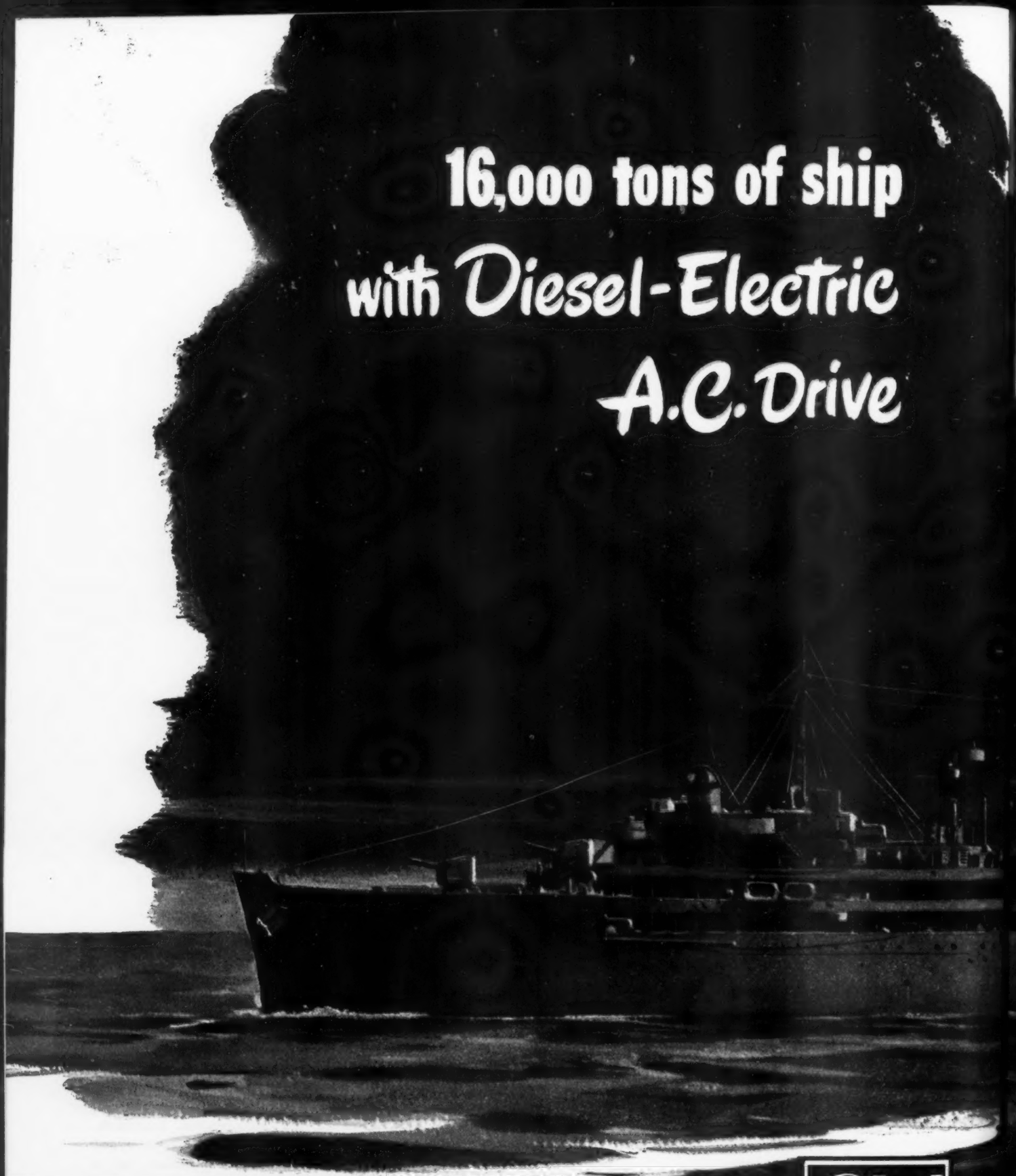
* *Chief of DIESEL PROGRESS Washington Staff.*



ENGINES *150 to 2000 H. P.* **CLEVELAND DIESEL ENGINE DIVISION,** *Cleveland 11, Ohio*

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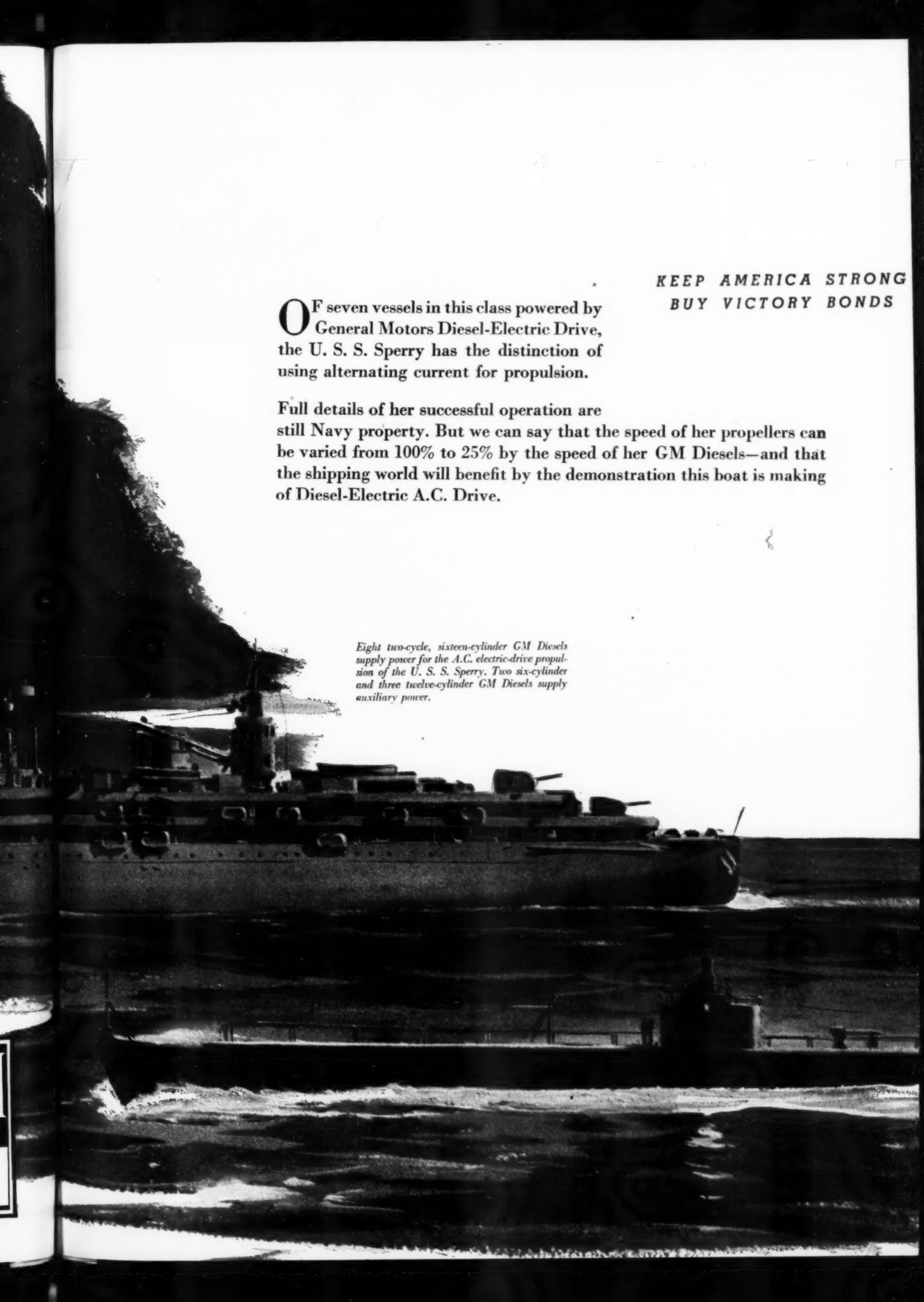
LOCOMOTIVES . . . . . *ELECTRO-MOTIVE DIVISION, La Grange, Ill.*

GM
GENERAL MOTORS
DIESEL POWER

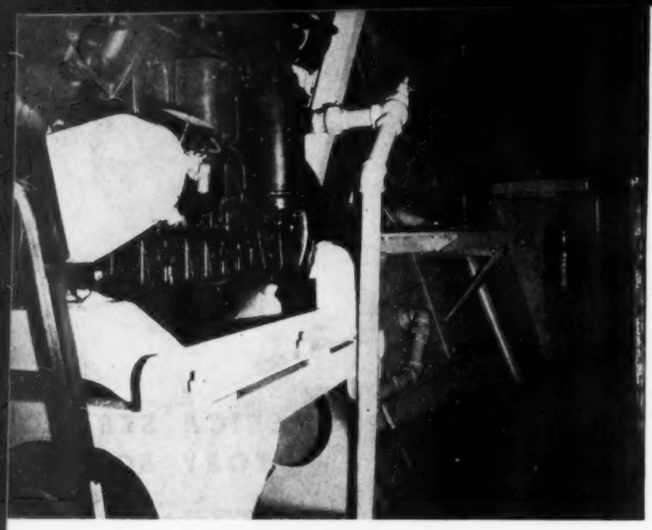
KEEP AMERICA STRONG
BUY VICTORY BONDS

OF seven vessels in this class powered by General Motors Diesel-Electric Drive, the U. S. S. Sperry has the distinction of using alternating current for propulsion.

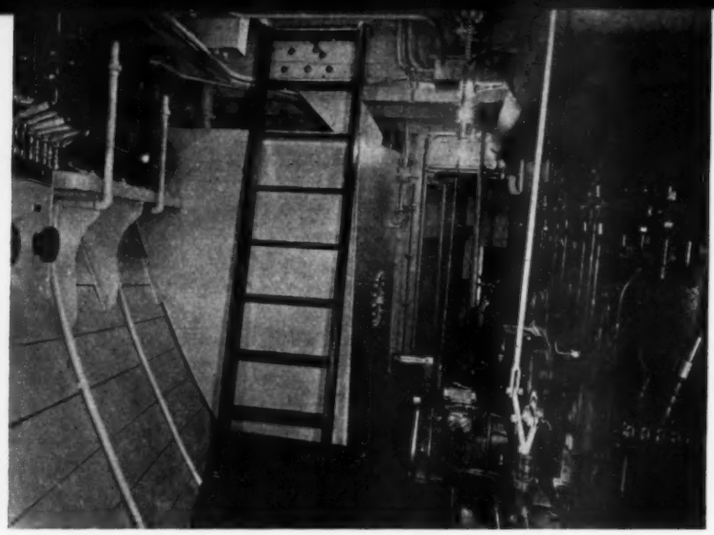
Full details of her successful operation are still Navy property. But we can say that the speed of her propellers can be varied from 100% to 25% by the speed of her GM Diesels—and that the shipping world will benefit by the demonstration this boat is making of Diesel-Electric A.C. Drive.



Eight two-cycle, sixteen-cylinder GM Diesels supply power for the A.C. electric-drive propulsion of the U. S. S. Sperry. Two six-cylinder and three twelve-cylinder GM Diesels supply auxiliary power.



General Motors Series 71 Diesel auxiliary unit. Note Quincy compressor upper right.



View looking forward along operating side of the main Atlas Diesel.

U. S.-BUILT DIESEL SEINER FOR ICELAND

By CHARLES F. A. MANN

NO more fitting close to a huge wartime shipbuilding program, not only on Puget Sound, but on the whole Coast, and a capstone for the mighty work done by the whole U. S. boatbuilding industry, could be imagined than the completion of the husky Diesel purse seiner, *Fanney* and delivery of her to the Government of the Republic of Iceland late in August.

Tacoma, original home of the purse seine type of fishing vessel, had the signal honor of being commissioned by a Foreign Government, through a strictly cash deal not on Lend-Lease cuff, to build a wood and Diesel fishing vessel to introduce power purse seine fishing to the huge Icelandic fisheries industry. Pacific Boat Building Co. had the honor of building it, and coming as it did almost on V-J Day, the trial trip was held with all the fanfare of a civic celebration, replete with salmon fishing derby off Point Defiance Park. It was a great day for everybody. By the way, *Fanney* is Icelandic for "Snow Capped Island."

Proud was Captain Ingvar Einarsson, who quietly came to this country as representative of the Icelandic Government in December, 1944, and spent two months aboard a seiner getting the "feel" of the American way of catching a whole school of fish in one quick snatch. Then he came to Tacoma and shopped around to get a good bid on an experimental seiner for his Government. Sticking it through as Government-Owner's Representative, and working through the Icelandic Vice Consul Kolbeinn S. Thoardson of Seattle and Vice Consul Bardi G. Skulason of Portland, who both had a hand in keeping official tabs on the project, for their Government's Minister, Thor Thors, Minister of Iceland at Washington, D. C. . . . Even for a purse seiner there were bales of red tape in handling priorities, maritime commission and customs regulation, steamboat inspections for a ship for foreign account, export licenses and financial transactions, not to mention keeping the title clear at all times.

"Pretty nearly as much Government red tape as there was labor in the hull," was the dry explanation given by Capt. Einarsson, who will operate the vessel in connection with his large fisheries on behalf of the Icelandic Government, at the home port of Reykjavik.

M. I. Broback, of Pacific Boat Building Co. sailed on the *Fanney* as mate on its long voyage to Iceland, and Tom Olson, of the affiliated Pacific Machine & Iron Works took the boat from Tacoma to New York, as chief engineer.

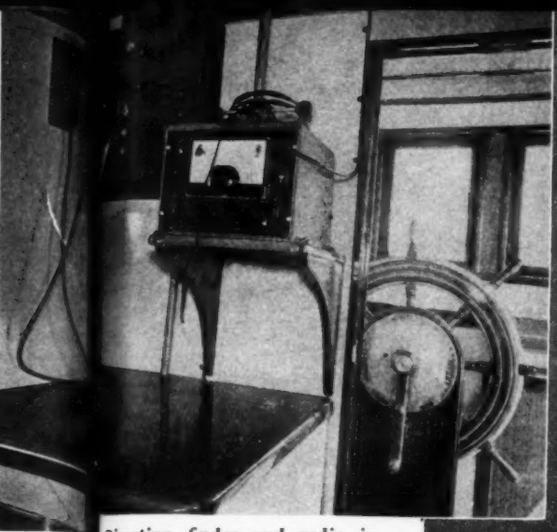
Basically, Icelandic fishermen use a two-boat, hand-operated purse seine which requires upwards of 20 men to operate. If the *Fanney* is successful, it will produce twice the fish with half as large a crew, and will be the forerunner of a revolution in Icelandic fisheries. Herring is the principal catch there. And still another "first": The *Fanney* is the first purse seiner built for any region in the world outside the North Pacific Coast of the U. S. A.

The trim seiner is of the so-called "giant" type, and is 86 ft. 4 in. overall length, 22.2 beam and 10.7 depth (molded), and is 136.71 gross tons and 67.77 net tons. It carries welded steel tanks with a capacity of 6,000 gallons of fuel oil, giving it a cruising radius at about 9½ knots of nearly 7,500 miles. Lube oil capacity is 250 gallons and 1,200 gallons of fresh water. A crew of 11 is carried in large quarters on the main deck and in the stateroom aft of the pilot house.

Main propulsion plant is a 320 hp. Atlas Diesel engine, of their regular 4 cycle, trunk piston type. A complete lineshaft drive for auxiliaries is fitted on bearing hangars mounted on the engine room ceiling, to operate the Northern anchor windlass and the Northern drag winch. From this lineshaft by clutch and chain and V belt drive are 2 Deming pumps, for bilge, fire and deck service; and a 3 kw. Westinghouse 110 volt auxiliary generator. By ingenious use of a main engine clutch, the whole auxiliary layout can be driven by clutching in an 85 hp. auxiliary Diesel. This auxiliary is a Model 371, 3 cylinder 85 hp. General Motors Diesel operating at 1,850 rpm. A Quincy motor driven air compressor as well as a built-in compressor on the main Atlas Diesel charges the twin welded steel air bottles, with capacity enough for 50 starts.

The 110 volt electric load is carried by a large Willard battery set, which also provides steady power for the York refrigeration machine and the McDonald freshwater sanitary pump, together with navigation equipment and ship's lighting.

Dual Weston tachometers are fitted, and dual pilot house controls for the engine, as well as steering wheel, are fitted both inside and outside the pilot house. The main Diesel carries



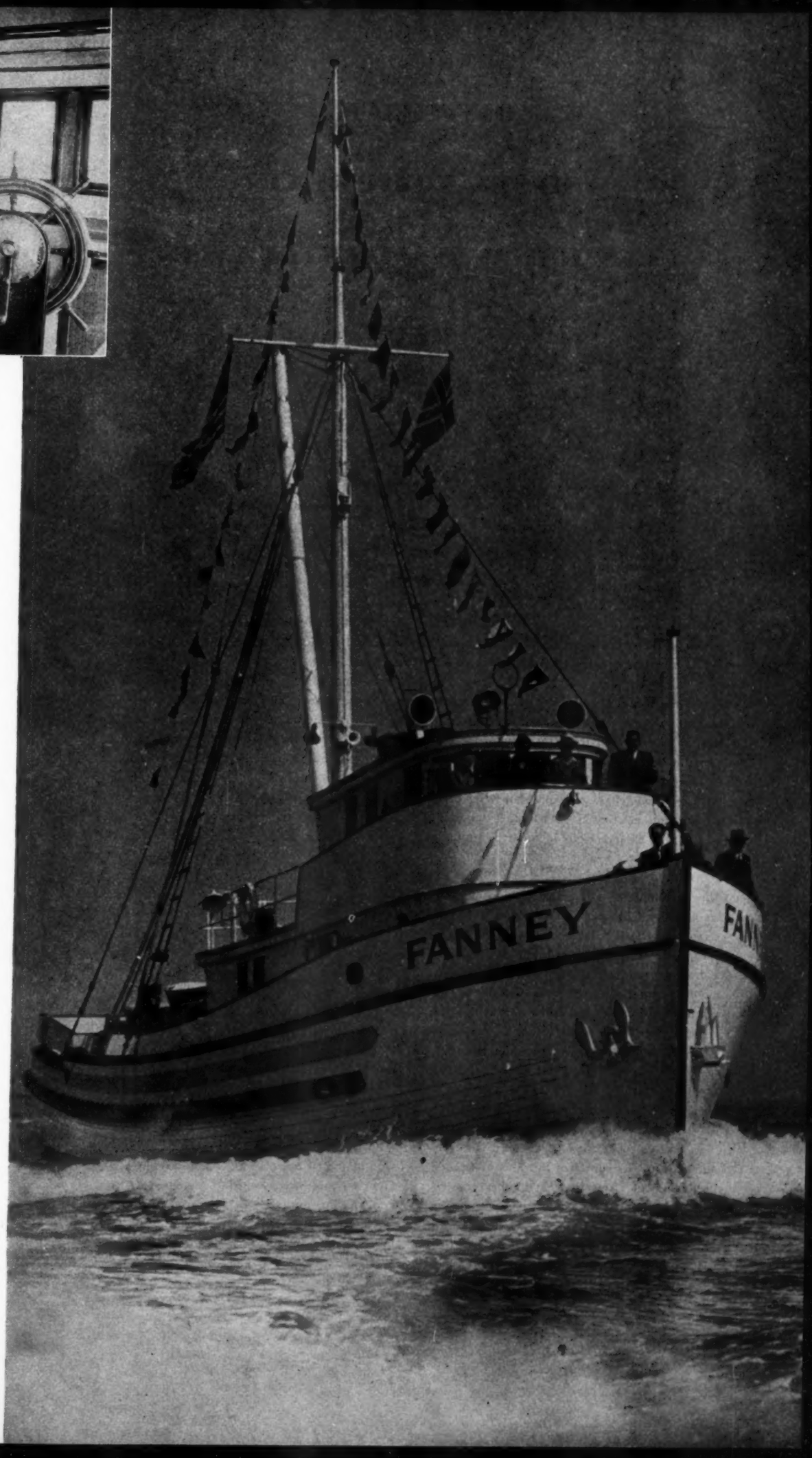
Direction finder and radio in chart room. Right: The "Fanney" doing better than 10 knots on trial run.

an Alnor pyrometer and drives a 3 bladed 68 x 44 inch Coolidge propeller.

A Karr radio direction finder is fitted as well as a 65 watt two way Northern radio telephone set. The galley carries an oil fired range; roomy double sink and large cold storage box, both frozen and regular temperature spaces being fitted.

She carries no stack, all piping and hot water tanks occupying a small room directly over the engine trunk, with false stack mounted atop of this space. The space saved is used for two large storage lockers to replace the former deck boxes customarily used. She will carry 180 tons of herring and turn up about 10½ knots speed. The ingenious application of the Northern dragger permits the boat to be used for several types of fishing as well as for herring.

Pacific Boatbuilding Company, represented by its new owner, John Brescovich of Tacoma, did an excellent job on this boat, and Manager Ed Broz is of the firm opinion that this seiner for Iceland "Has started something" in Europe's huge, but old-fashioned fishing industry that may give a lot of new peacetime business to American Diesel and shipyard people



OFF-TRACK DIESEL EQUIPMENT CUTS RAILWAY MAINTENANCE COSTS

By HARRY WALKER

"MOVE over, Old Man River—got to make room for another guy on this bed"—

The river, in this case, is the silvery Colorado—and the bed is the main line of the Denver and Rio Grande Western Railroad at Bond, Colo.—a mountain division point, one of the busiest of the entire Rio Grande system, which is known as the Scenic Line of the World.

Long trains, many pulled by giant 5400 hp. four-unit Diesels, had been crowding the terminal for months—and the Rio Grande decided early in March that additional track would eliminate the "pinch." But to have the extra track required "elbowing" Old Man River over 15 feet and erecting a 3,000-foot "extension" to the bed, 25 feet high, in order to support the new track.

Having completely eliminated the use of work trains, the Rio Grande assigned one of its Caterpillar Diesel bulldozers (80 hp.), equipped with a La Plant-Choate hydraulic trailbuilder, a dragline and trucks to do the job. In two months, a total of 21,000 yards of material was taken from the river bed and a new bank averaging 25 feet deep and 15 feet wide was built. Al Neff, supervisor of work equipment, estimated the use of this Diesel off-track equipment saved two-thirds of the cost that would have been entailed by other methods.

The most recent "rush job" at Bond is merely one of many accomplished by the Rio Grande in the use of Caterpillars and other crawler-mounted off-track work equipment during the war. When Henry J. Kaiser activities began to mushroom at Sunnyside, Utah, to provide coal from the high Columbia Mine on the Rio Grande's Sunnyside Branch, time was at a premium in constructing additional track facilities needed.

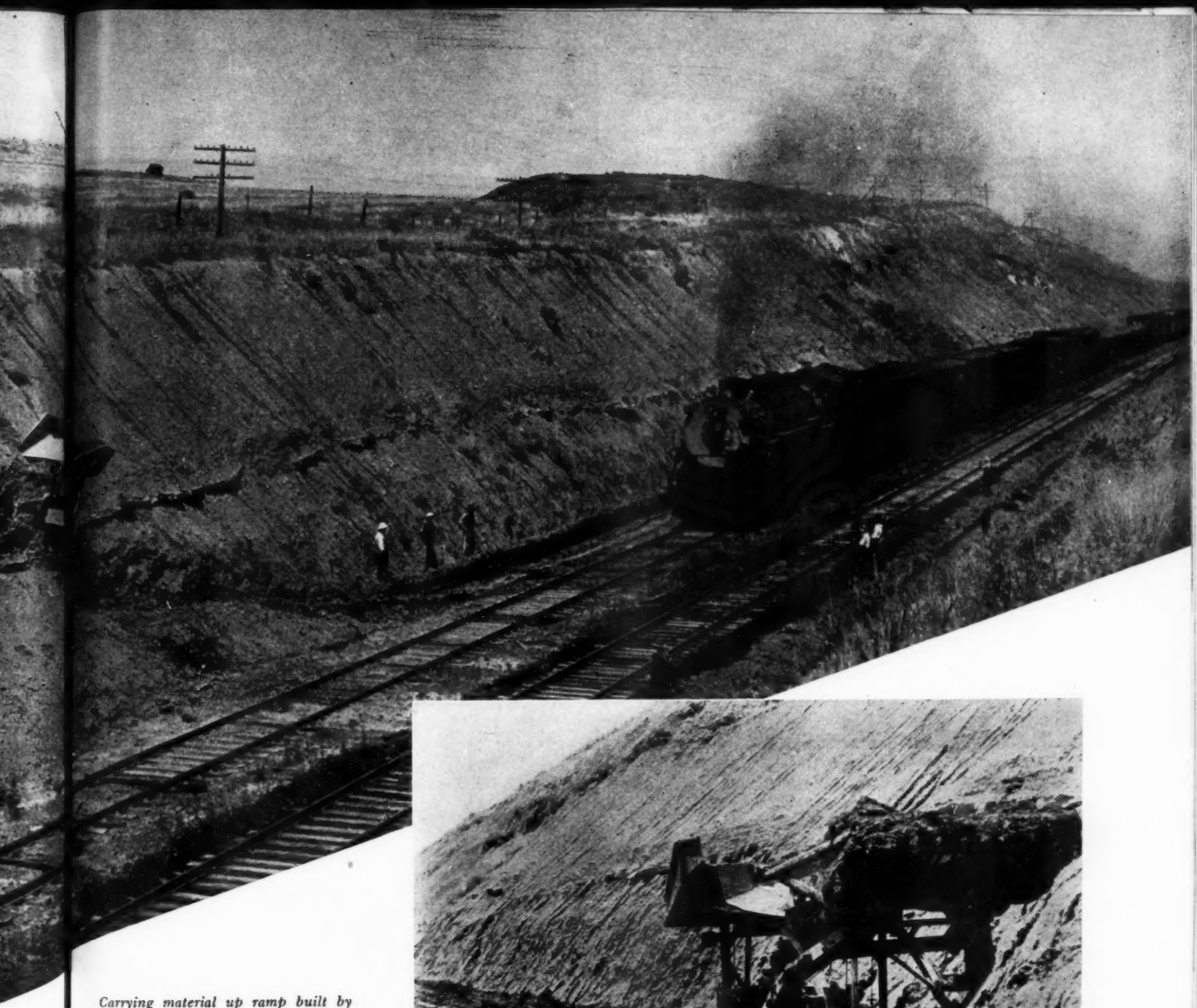
One phase of the project consisted of two track extensions of 2,125 feet each, averaging four feet of fill, and a wye track through a cut requiring 1,400 feet of excavation ranging from zero to 15 feet. One large dragline, one large shovel, and two 80 hp. Caterpillar Diesel bulldozers were used. The material in the cut was mixed with 20 and 30 ton boulders, making it necessary to use powder and drilling equipment. When one machine was held up, the operator "doubled up" on one of the other machines. All grading was completed in 16 days at very little expense to the railroad as compared to other methods.

On the Rio Grande, there are several locations where ditching is necessary every year. For example, near Soldier Summit, Utah, for years it was the practice to work on-track ditching equipment for several months each year. Since 1938, one and sometimes two Diesel crawler-mounted loaders have been doing this work effectively. On two installations of centralized traffic control, off-track equipment extended 13,000 feet of passing tracks, moving 23,000 yards of material. In addition to grading for passing track extensions, these machines excavate for bridge foundations, culvert pipe, drainage ditches and assist in building bridges.

One of the 80 hp. tractors is equipped with a Hyster double-drum winch. Along with its earth-moving duties, it is a valuable machine for any emergency, its maneuverability allowing it to work from any angle. It can roll or pull cars, trucks and other bulky equipment into the clear. Often, a small machine can produce results a large machine cannot. In railroad work, maneuverability is of prime importance.

The Rio Grande purchased its first off-track work equipment in 1936—a year after the railroad entered trusteeship and launched a multi-million-dollar rehabilitation program. Equipment has been added each year as the economy of operations proved the feasibility of flexible off-track facilities—and more is on order right now.

Six years ago, Al Perlman, chief engineer of



Carrying material up ramp built by Caterpillar Diesel tractor equipped with Athey Mobiloader on the D & RGW RR near Pueblo, Colorado.

Here the same unit is ditching a new cut.

Unloading ditched material up on top of the cut.

the Rio Grande, pioneered a daring policy for the railroad industry—complete elimination of steam ditchers and steam shovels used in conjunction with work trains. The old equipment was replaced by an investment of $85,000 in modern crawler equipment—with the result of an annual over-all saving of $750,000 on the investment. Today, these crawler-type machines have eliminated the use of work trains on the Rio Grande, except for distributing rail or doing emergency work. Perlman will tell you it would have been practically impossible to properly maintain the railroad during the war without this versatile off-track equipment. Further-

Heavy, off-track construction and maintenance operations are carried on with Dieselized equipment without hampering train movements.

more, where it used to cost 40 cents to $1 to move a yard of earth, it now costs from three to five cents on the Rio Grande!

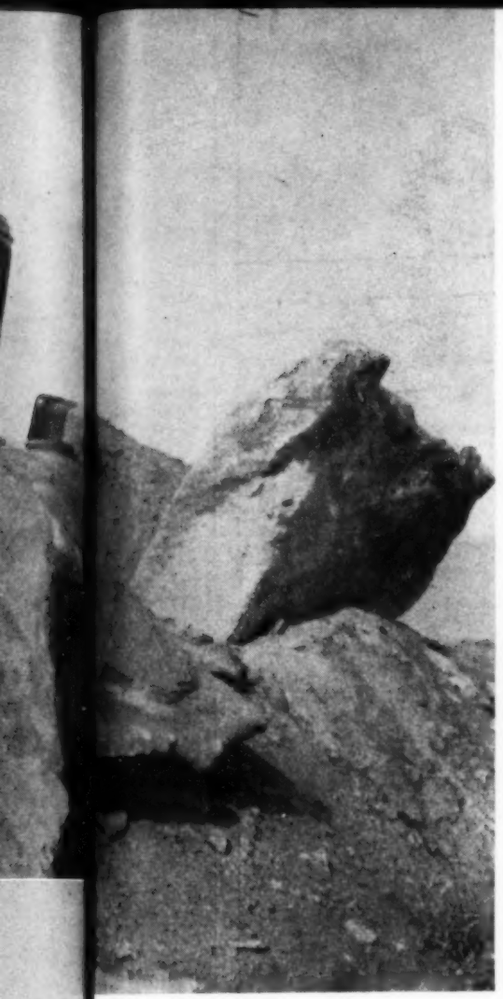
Translated into man hours—for the saving is practically all in labor—the broad benefits of off-track crawler equipment can readily be seen. Elimination of work trains has meant that numerous delays to revenue trains were eliminated, among other factors.

The bulldozer has so evidenced its versatility and proved its economy on the Rio Grande that it has taken its place alongside the No. 2 shovel as one of the "must" tools of the maintenance forces, Perlman says. It can be equipped with a boom to handle material; with accessories to handle dirt; with devices to cut brush; with winches to do all-purpose jobs; and as a wintertime machine, with blades, to handle snow.

It is adapted to work such as bank widening riprapping, filling bridges, shifting tracks, grading for additional tracks, dismantling branch lines, leveling station grounds, clearing slides and washins, spreading ballast, cleaning ditches, loading trucks, cleaning coal storage piles and plowing and loading snow. Washins and washouts can be repaired in a sixth of the time required by the old steam ditcher and work train, for not only can the machine be maneuvered more speedily, but it can also attack the job from many advantageous locations.

Equipped with a winch having a 35,000-pound pull, a bulldozer can clear derailed cars in much shorter time than the cumbersome wrecking crane. On the Rio Grande, the use of a bulldozer with snow blades in wintertime has obviated the necessity for reconstruction of a snow shed on one of its branch lines, which would have cost $36,000. On another branch line, it was found practical to dispense with the use of a rotary plow by equipping two bulldozers with snow-clearing attachments.

Since the development of multiplate pipe, it



has been found possible to fill many bridges where formerly the drainage area could not be properly serviced except by a bridge opening.

In old methods of filling bridges, ma.erial was dumped from the top by dump cars, and after the stringers were removed from the new fill, many years of expensive maintenance were required before the fill became properly compacted. Using the bulldozer and carryall or other dirt moving accessories, proper compaction can be obtained immediately by filling in thin layers from the ground up, so that it is unnecessary to continually surface the track as was formerly required and material can bc placed at ten per cent of the former cost.

Dispatchers can concentrate on dispatching regular trains instead of putting out work orders to work trains. And in cases of traffic. interruptions, it is no longer necessary for the Rio Grande to restore the line by working from both ends, thus tying up traffic. The work can be carried on at as many points as equipment and men can work to advantage.

As an example, several years ago, cloudbursts brought down 19 extensive washins in six miles of canyon area. Prior to the purchase of crawler type equipment, it would have been necessary to open the line by using a steam ditcher at each end. The line was opened in less than a fourth the time required with the older type of equipment by the use of bulldozers at various points throughout the cloudburst area. These same machines, equipped with winches, can work much more quickly and effectively in most situations involving traffic interruptions. If necessary, they can be used to build a shoo-fly around paralyzed traffic in record time.

"Never in the past thirty years on the Rio Grande has the ratio for ordinary maintenance been as low as it is now that we are using off-track equipment," said Perlman. "Draglines, shovels, bulldozers, carryalls, scrapers and front-end loaders which have revolutionized dirt moving costs and made possible the construction of line changes heretofore not deemed economically feasible, will be used more extensively than ever before in maintenance operations and in the rehabilitation of lines temporarily out of service due to acts of God," he said.

"It is impossible to over-emphasize their great usefulness; for when not in use on heavy construction projects, they can be so equipped as to be in use during the entire year ditching, riprapping, grading, bank widening, trenching, loading stock car bedding sand, loading and unloading coal, and other materials during the summer—and handling ice and snow in the winter," said Perlman.

"On railroads which have adopted them extensively, it has been found difficult to find time to permit them to be placed in the shop for overhauling. And regardless of the number of machines in use, so many additional needs are fulfilled by them that it is a rare occasion when one can be found idle."

Viewing the future needs in off-track equipment design, Perlman states that with a sharp increase in rates of pay, it is now necessary as never before to completely mechanize every possible operation in the construction and maintenance of way and structures. In order that the greatest utilization may be obtained from the machines purchased, they should be designed for all-year use and for as many purposes as practicable, he believes.

Competitive conditions in the field of new construction have made necessary evolutionary changes in dirt-handling equipment, he points out. Diesel crawler-mounted machines have materially aided maintenance operations—"but as yet there has been found no pile driver which is fully satisfactory for all conditions imposed by new construction maintenance and emergency work.

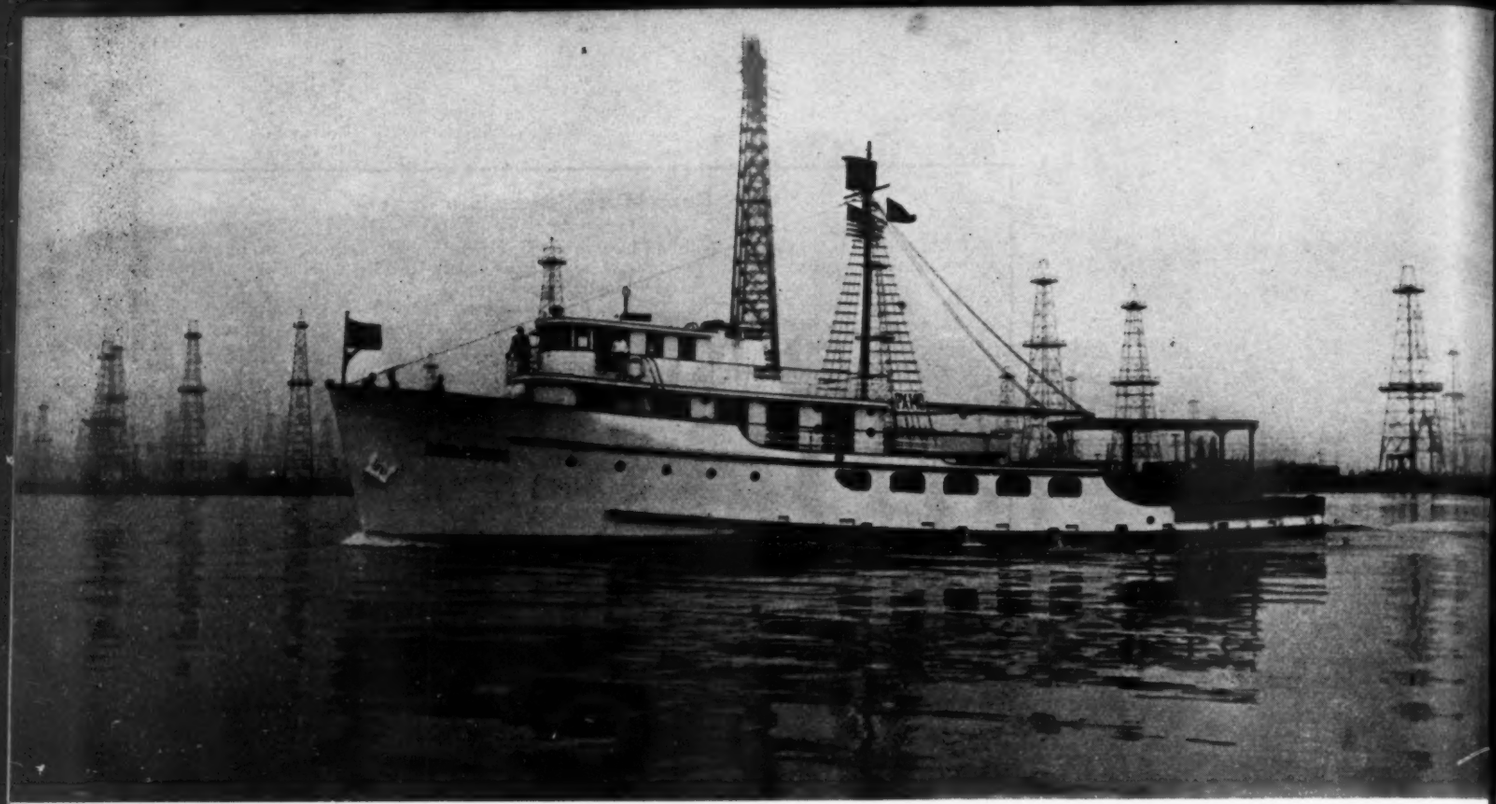
"The pile driver in general use is a large cumbersome machine good only for one purpose. Marked improvements can be made through the design of a land driver mounted on crawler tracks with an air-operated hammer which could be used as a crane, dragline, or shovel when not in use as a pile driver. At present there are machines of this type equipped with swinging leads. But for the heavy duty required in railroad construction, they have not proved as satisfactory in driving batter piles as the track driver used almost universally in maintenance work."

"Let's Have More," says Rio Grande

Trustees of the Rio Grande Railroad have received Federal Court authority to purchase four more Caterpillar tractors for off-track maintenance work—two D-7 types equipped with LaPlant-Choate Trailbuilders and Hyster single-drum winches; and two D-7's with LaPlant-Choate blades and power control units for operating carryalls; also two eleven-yard carryalls. In addition, the road is planning to obtain two Diesel-operated 15-ton cranes for store yards as soon as such equipment is available for purchase.

Typical Month's Performance Chart for Rio Grande's Off-track Caterpillars:
(Month of June, 1945)

Type of Caterpillar	H.P.	*Monthly Expense* Labor	Materials	Total	Days worked	Cu. Yds. handled	Cost per Cu. Yd.	Type of Work Done
D—4	45	$204	$29	$233	21	2,000	.107	Grading
D—7	70	317	65	382	24	7,000	.049	Grading
D—7	80	354	59	413	27	10,650	.033	Ditching & loading rock
D—4	45	204	29	233	21	2,000	.107	Ditching
D—6	60	240	35	275	17	4,325	.048	Grading—repairs
D—7	80	291	53	344	21	14,000	.022	Ditching—repairs
D—6	60	300	50	350	25	18,500	.019	Ditching
Totals		$1,910	$320	$2,230	156	58,475	.034	



The "Courageous" returning from trial run on which she did 13½ knots.

DIESEL CLIPPE

By WILL H. FULLERTON

MODERN as milady's hat, the new all-welded, 131-foot steel and Diesel tuna clipper *Courageous* constructed by the United Concrete Pipe Corporation, Long Beach, California, is the answer to the waterfront question—"What are fishing craft going to be like in the future?"

This cruiser-stern, clipper-bow vessel was designed by G. Bruce Newby, naval architect and former supervisor of wooden ship construction on the Pacific Coast for the United States Maritime Commission, in cooperation with Cecil Drake, the shipyard's administration manager. Basically, Newby is a "steel boat" naval architect and his years of experience in steel design shows clearly in this fast, graceful, more economical and more comfortable long-distance "fisherman." A scale model was carefully tested in tank before construction was begun.

The American tuna clipper for postwar fish ranging is the result of scientific development that dates back to the years 1924-25 when the albacore (the white meat tuna), in commercial quantities, disappeared for no apparent reason from the waters off the coast of Southern California. Their disappearance necessitated the development of a long range fishing boat that could go far south—as far south as the waters off the coast of South America.

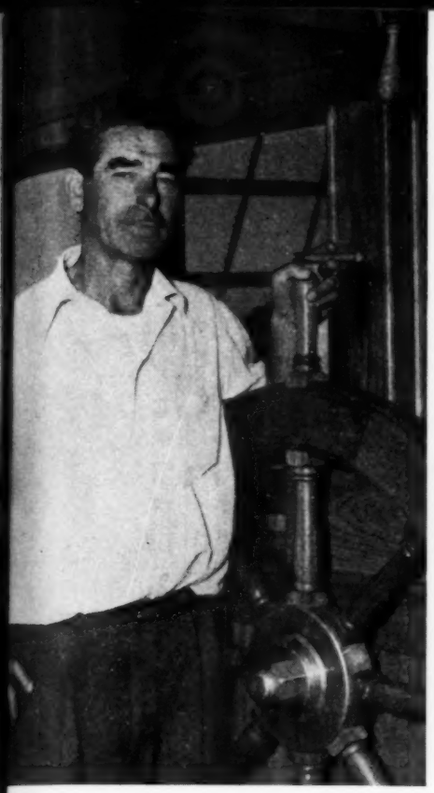
The first fishing boats used for this purpose were mere adaptions and conversions of the boats then in use. But the long trip involved and the tropical conditions encountered made imperative speicalized types of boats. The development of a special type of boat to meet these conditions and the culmination of that period of development by the modern, large size tuna clipper now in production marks the end of an era as full of romance as the development of the famous "Yankee" clipper of sailing days.

Much of the glory of the Yankee clipper is how men fought storms with small ships. But a tuna clipper is smaller than the ships these sailing men had. Fishermen in boats no longer than 60 to 70 feet now fight these same tropical storms—tuna clippers with cargoes as valuable as the sailing clipper's tea now race for the markets. Some ships never return—such was the fate of the *Belle Isle,* a clipper which put out from San Diego and mysteriously disappeared in the Gulf of Panama, though equipped with radio. And there are stories of men missing, and strange incidents, and near accidents. Such as that of a fish that leaped from the sea, slashing a fisherman's throat so badly that but for the presence of a surgeon aboard, the man would have bled to death.

The tuna clippers, of which this is one of four now in production by United are of all-steel construction with the exception of wooden joiner work in the deckhouse and the hold insulation, which is cork.

Incorporating the most modern but proven ideas, the vessel has unusually good ventilation, a fidley permitting plenty of light and air, and there is an inside passageway from deck to engine room. Principal dimensions are: length over all, 131 ft.; beam molded, 27 ft.; depth molded, 14 ft.; total fish capacity, 300 tons; fuel capacity, 40,000 gallons.

Of the raised deck type, tuna clipper design



Manuel Souza, Captain and part owner.

Miss Dorothy Abbott (Lady Neptune) with scale model of the "Courageous" which she sponsored.

PPE OURAGEOUS"

the stern is of true cruiser construction, making it more slender than the usual modified stern of fishing boats, and having a definite rake. The electric welded hull plates vary from ⅜ in. to ¼ in. in thickness. The stern frame is a built-up weldment of plates. These plates are flush welded which gives a perfect streamlined flow of water to propeller.

The vessel is of double bottom construction with a center verticle keel. This center keel is an oil-tight girder, providing eight fuel oil tanks. Four of these fuel tanks are under the machinery space and four are under the brine well space.

The hull of the vessel is divided into six subdivisions by a transome and transverse bulkheads which extend to the main deck. Moving from forward to aft, the first transverse bulkhead forms a subdivision wherein are located the forepeak tank, for fresh water, followed by a deep fuel oil tank. These are separated from the machinery space by a water-tight bulkhead.

Going aft from the machinery space, the subdivision holds the brine wells and shaft alley. In the last subdivision, formed by the aft bulkhead are located the afterpeak tank and the lazarette. In this subdivision there is an afterpeak tank which is used for fuel oil and two fresh water tanks in the lazarette.

The vessel is fitted with mast and single cargo boom and these are rigged in tuna boat style. For shore and work boats there are a large skiff, a small skiff and a 16-ft. power boat, all three stowed on the raised deck.

The main propulsion engine is a six-cylinder, air-starting and direct reversible 14½ x 20, 840 hp. at 300 rpm. Superior marine Diesel fitted with Elliott-Buchi exhaust gas-driven supercharger. Engine cooling is with fresh water circulated through salt water heat exchanger. Main engine is direct connected to the three-blade, solid bronze, right hand turning propeller with bronze fair-water over nut. Propeller shafting is 6¾ in., the tail shaft 7½ in. of rubber covered steel. This rubber covered tail shaft is of the type that has been so successfully used by large ocean-going craft.

The auxiliary Diesels are also Superiors, six-cylinder, 175 hp., 8½ x 10½ turning 514 rpm. units direct connected to Fairbanks-Morse a-c generators developing 125 kw. (156 kva.)

All pumps are by Fairbanks-Morse and driven by F-M motors. This includes bait water circulating system, brine transfer and emergency bilge system, brine circulation, fire and wash-down system, and the sanitary systems. Part of the salt water system is arranged through valved manifolds to provide emergency or additional service to bilge and heat exchangers.

The heat exchangers handling engine cooling water are served by a 3 x 4 in. vertical pump direct connected to a 10 hp. electric motor. The fuel oil transfer system is provided with two positive displacement pumps capable of 50 gpm. each with 1½ hp. electric motors. These units are so arranged that they can be used in tandem or individually for fuel transfer between any two tanks.

The refrigeration system is the builders exclusive design and is the result of considerable research and development. The three main compressors are each 6 x 6 in., single acting and driven by individual 25 hp. electric motors through multiple V-belt drive. This main system is capable of handling 125 tons of tuna

on the first day's catch. There is an auxiliary refrigeration system for the galley and storage lockers consisting of a 3 x 2 in. ammonia compressor.

Steering device is of the gear type with roller bearing carrier for the rudder stock and ball bearing thrust housed in a steel box. The steering is devised for either manual or power operation.

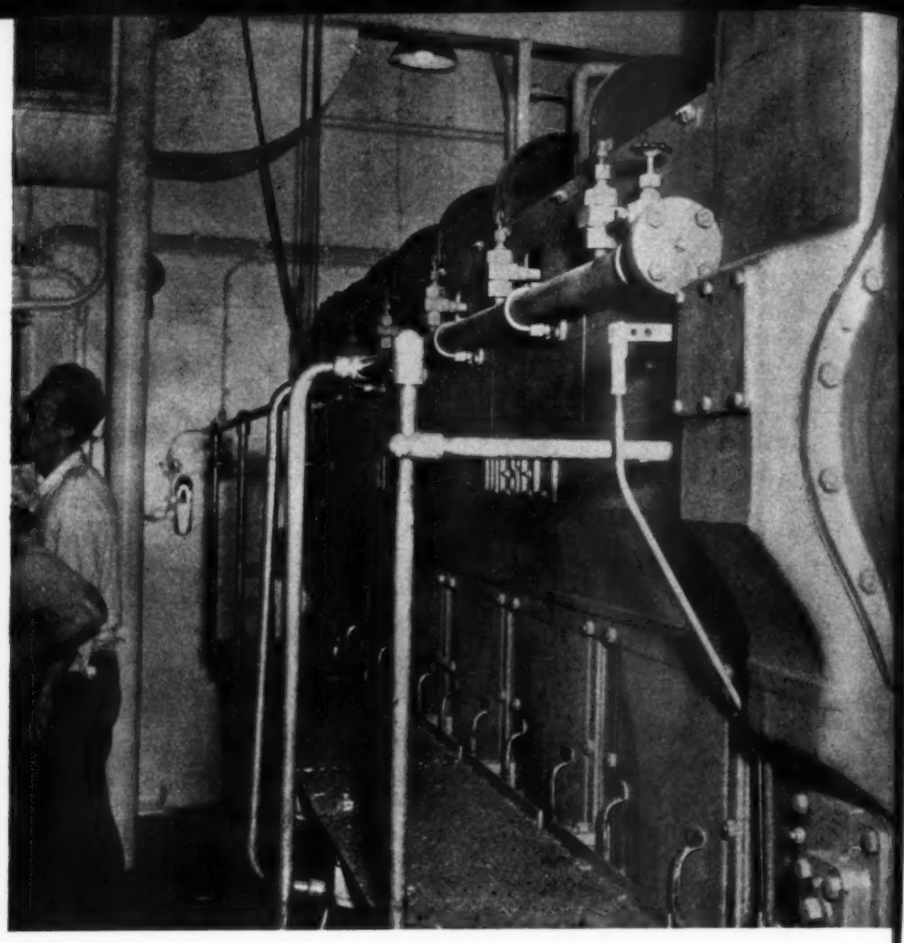
Special features of this ultra-modern tuna clipper include the placing of the machinery very low which obviates the necessity of an extremely wide boat, but at the same time giving ample positive GM—yet not too much so as to make it snappy. The vessel rolls steadily and rides easily—thus providing a good fishing platform. In regards to fishing, the stern can be lowered until it is flush with the sea, but when the boat is under way the stern can be raised to a 24 in. free board, even when she is fully loaded. The trimming of the vessel is accomplished by the transfer of fuel oil.

There are no wooden tanks aboard, all being steel. Further, there are no dual-purpose tanks except six brine wells which are used for bait in addition to the regular bait tanks on deck. All the tanks throughout the ship are insulated with 6 in. of cork for a total of 44,000 b.f. of this material.

Additional features include the insulation of crew's quarters throughout against heat, cold and sound. The sides and ends of their quarters have spun glass insulation with a plywood interior finish. The floors are wood over steel with intervening air space. Air holes are so arranged that there is a constant circulation in this space resulting in a cool and comfortable interior.

An innovation in regards to crew's quarters is the extension of the bridge deck to the sides of the ship. This extension of the deck shades the sides of the deckhouse and gives protection both against the sun and from the rain, while at the same time it allows all possible circulation of air. And all berths are equipped with individual fans.

Moreover, special attention was given to the problem of ventilation when this vessel was designed. There is a large forward cowl ventilator provided with an intake fan which supplies air to the lower part of the ship. Additional ventilation is secured by the use of two up-cast ventilators, with exhaust fans in each, which terminate in the fidley. These ventilators are run through lrager vents from the galley and thus draw the heated air from the galley. The vents will change the air in the engine room every five minutes.



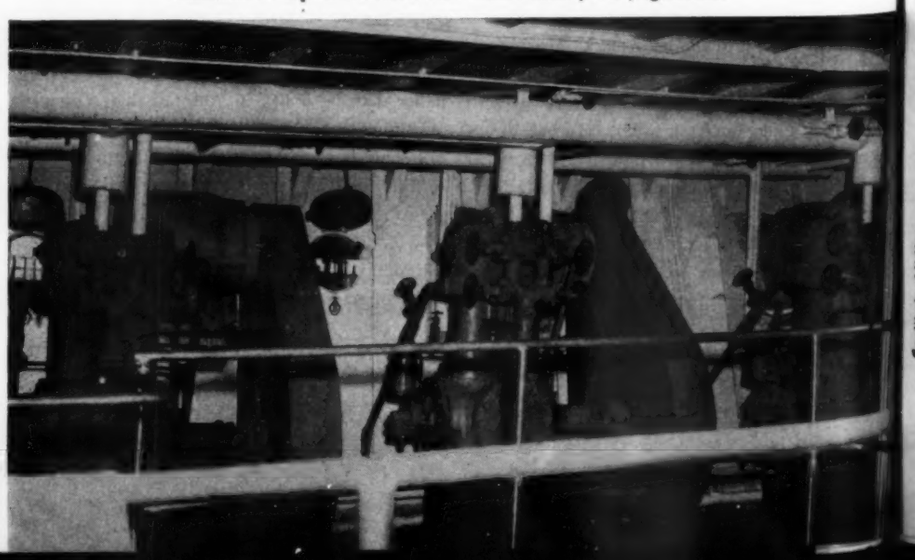
Propulsion engine is a Superior, 840 hp. Elliott-Buchi turbocharged Diesel.

Communication, ship-to-ship and ship-to-shore, is by means of a 500 watt combination short wave wireless and radio phone. A feature here is the elimination of the usual forward mast which is always more or less of an obstruction to clear straight-ahead vision. Too, this elimination of the forward mast tends to increase the rakishness of the vessel, lending a destroyer-like appearance.

Owners of the D.S. *Courageous* are Lewis L. Livesley, managing owner; Cecil W. Drake, Captain Manuel J. Souza, and Chief Engineer James R. Souter. And, last but not least, this 500 net ton ship has a cruising speed of 11½ knots, and a top speed, light, of 13 knots.

Additional equipment of the *Courageous* includes: Woodward governors on all engines; Worthington compressors; Yale hoist; Purolator filters for fuel oil; Michiana filters for lube oil; Viking fuel transfer pump; Ross lube oil cooler; U. S. gauges; Maxim silencer on main engine; Burgess snubbers on auxiliaries; Alnor exhaust pyrometer; switchboard and gear by Square D; instruments by Westinghouse; water valves by Crane; Fulton-Sylphon lube oil pressure temperature alarm; and a Bill Lambie propeller.

Ammonia compressors with F-M motor drives for refrigeration.



THE BENEFITS OF VIBRATION CONTROL

By S. ROSENZWEIG*

VIBRATION control is now recognized as a major factor in economical and efficient manufacturing. From the standpoint of machine life, it is frequently as important as correct lubrication. Its benefits to human beings rank with proper lighting and good ventilation. Some of the outstanding advantages are enumerated herewith and will be more fully dealt with under their respective headings:

1) Increased output of machine
2) Reduced spoilage of finished products
3) Improved efficiency of production
4) Simplified construction and lengthened life of machinery installation
5) Increased safety factor of installation
6) Reduced transmission of vibration
7, Improved health of workers.

* *President, The Korfund Co., Inc.*

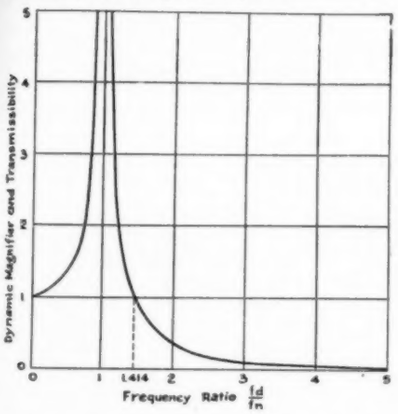


Fig. 1– vibration and transmitted force as a function of frenquency ratio

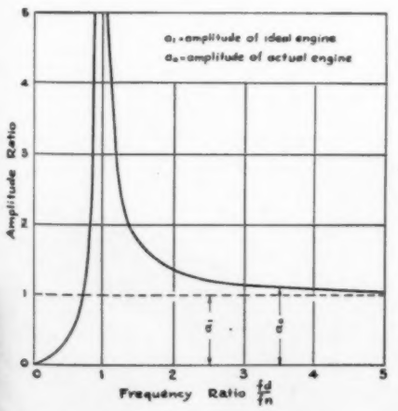


Fig. 4–vibration amplitude as a function of frenquency ratio

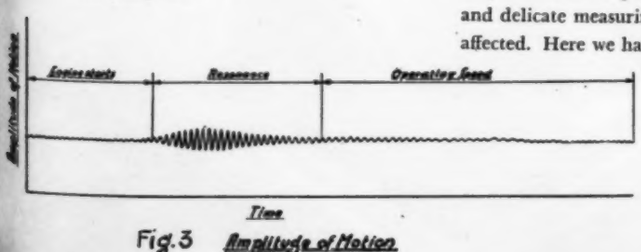


Fig. 3 Amplitude of Motion of Foundation System.

Increased Output of Machine

Every movement of a body is the result of forces acting upon it. If these movements are intentional, properly directed and controlled, they are technically valuable. If these forces, however, produce movements which cannot be put to some use they represent a loss of energy which is definitely detrimental. This is, for instance, the case when the foundation of a machine and the soil on which it rests are set into vibratory motion by the operation of the machine. Practical experiments have indicated that up to 10 per cent and more of the energy of a prime mover may be dissipated in this manner. A correctly designed spring suspension, however, with a minimum of damping will save a considerable amount of this otherwise dissipated energy. This effect can be most strikingly demonstrated on large motors, appearing as an appreciable increase in speed when motors are correctly isolated. It is obvious that large amounts of money spent in equipment and manpower are thus wasted in unproductive work due to vibration.

It is, therefore, imperative from an economical standpoint that designers of machines balance moving parts as far as it is possible, and that foundation engineers create installations in which the effect of any remaining unbalance is corrected at its source by means of vibration control.

Reduced Spoilage of Finished Products

Uncontrolled vibration, however, does not merely result in a loss of energy. It also often causes spoilage and destruction of the very thing which a machine produces. The fine tolerances with which parts are fitted make it essential that such equipment as grinders, lathes, cutters, etc., work with perfect smoothness. A chattering tool vibrating but a fraction of a thousandth of an inch will leave its indelible mark on its victim. And it is immaterial whether such vibration is created by the machine itself or transmitted to it from other sources. The very touch of the operator handling adjustments and delicate measuring instruments is adversely affected. Here we have a combination of effects which make accuracy difficult and sometimes impossible.

This is what W. A. Strobel, Plant Engineer of Cessna Aircraft Company, has to say on this subject:

"Our Ceco Stamps are all mounted on floating concrete foundations, supported on Steel Spring Vibro-Isolators. By using these Vibro-Isolators we have been able to locate the hammers in the plant without causing any disturbance from vibration to adjacent equipment, and to effect most efficient production. It is evident that the spring mountings will lessen the maintenance cost and increase the life of the machines. The efficiency of the workmen has also increased, resulting in less spoilage and fewer accidents."

Improved Efficiency of Production

In order to obtain highest production efficiency, work has to pass through a shop with a minimum amount of handling and interference. This dictum requires that machines are arranged in such manner that work travels from one machine to the next one in a rational manner. This may often necessitate the placing of presses and hammers in the immediate neighborhood of precision machinery which are extremely sensitive in their reaction to even minute vibrations. Correct vibration control enables the plant engineer to arrange his machines in the proper sequence of their functions.

Simplified Construction and Lengthened Life of Machinery Installation

It is obvious that the application of the spring suspension to dampen vibrations represents a great departure from methods previously used. Instead of rigidly bolting down a machine, it is now installed so as to operate yieldingly. The strains which otherwise are set up in the bearings and frame of a machine are thus avoided, permitting the use of lighter construction throughout. This, in turn, usually results in lower foundation weights, smaller necessary floor areas, lighter substructures, and reduced excavation, all adding many advantages of economy to the already established physical benefits.

Increased Safety Factor of Installation

Important is the fact that the correct spring mounting allows one to draw definite conclusions as to the dynamic correctness of a ma-

chine's design. Unbalance beyond that upon which the mathematical calculations were based will quickly show up in the behavior of the spring suspension. Forces which would otherwise be apparent only by increased vibratory transmission and ultimately by increased wear of machine parts can be promptly detected and corrected.

Two interesting cases from the author's own experience may be cited here. In the first one, two identical 6-cylinder 4-cycle Diesel engines directly connected to 750 kw. generators operating at 257 rpm. were installed on one foundation which with engines and generators weighed approximately 900,000 lbs. The foundation, symmetrical as to its dimensions and arrangement of the Diesel generator sets, was mounted on steel spring Vibro Isolators. Each engine was tuned up and separately operated during the running-in period. The operation of one of the engines produced a rather violent movement of the foundation, in spite of its enormous mass. Careful inspection of every single part indicated an unbalance in the flywheel which was corrected by adding to it a weight of 40 lbs. Smooth operation of the engine with no perceptible movement of the foundation was the result.

In the other case, three 5-cylinder gas engines, direct connected to centrifugal pumps, were installed on separate foundations, all isolated by means of steel spring Vibro Isolators. Though vibration control remained satisfactory after months of operation, a steadily increased oscillation of foundations was observed. This condition was promptly remedied by cleaning the spark plugs of the gas cylinders and thus improving and equalizing combustion.

Even in such machines in which an attempt is made to provide practically perfect balance, as for instance, for the six and eight-cylinder Diesel engines of the 4-cycle type, slight unavoidable changes in the manufacturing process, variations in piston clearances due to unequal expansion and adjustment, and in other operation conditions will upset the theoretical calculations. A correctly designed spring suspension will immediately indicate such unbalance which might otherwise remain undetected. It is a warning signal to the engine operator to take corrective measures or suffer serious damage to his machine.

Reduced transmission of vibration

Most of the underlying physical laws and mathematical calculations are beyond the scope of this paper. However, every engineer and even those laymen who are in contact with engineering problems should be familiar with some of the fundamentals. A short explanation will suffice.

First, it is imperative that no resonance exist

Below: Two Superior, 6-cylinder, 260 hp. Diesels with Crocker-Wheeler generators installed in de luxe apartment building at 875 Fifth Ave., New York. Isolation consists of 12 UV/15 Korfund Vibro-Dampers as seen in the insert, left.

under permanent operating conditions, between the forced frequency of the machine and the natural frequency of any part with which it is in contact, as substructure, building walls, etc. Resonance exists when these two frequencies are alike. Even small forces can gradually build up amplitudes of high magnitude in the resonant range. Yet, even without resonance existing, vibrations will be transmitted unless these forces are reduced to a minimum. This can be accomplished by placing under the machine which has a definite forced frequency, an elastic medium whose natural frequency is less. An isolation efficiency of about 65 per cent is obtained when this frequency ratio is 2:1 and 93 per cent when it is about 4:1. Local conditions govern the required isolation efficiency. Hospitals, auditoriums, concert halls, and residential sections require usually a greater isolation efficiency than factories, warehouses, and many commercial installations. In the last analysis, however, it is the magnitude of the residual force passing through the isolator which has a considerable bearing on the degree of efficiency to be selected. This is especially true in connection with impact and greatly unbalanced machines.

The diagram Fig. 1 tells the story of vibration absorption graphically. Its efficiency is represented by that fraction of the vibratory force which is prevented from being transmitted to the substructure. The efficiency increases as the frequency ratio increases. Since the forced frequency is usually fixed through the prevailing conditions, the efficiency of the system depends upon the natural frequency of the isolator. Physical laws tell us that this frequency is principally controlled by the deflection of the elastic medium.

The following table shows some interesting comparisons by choosing a few disturbing frequencies at random and selecting two isolating efficiencies, 65 per cent and 93 per cent respectively.

Disturbing frequency of machine cycles per min.	Required deflection of isol. medium for 65% Efficiency	93% Efficiency
4240	1/100 in.	1/32 in.
1220	1/10 in.	3/8 in.
752	1/4 in.	1 in.
432	3/4 in.	3 in.

To the person not familiar with the physical laws, some of these figures may appear amazing. If we refer, for instance, to the forced frequency of 432 cycles per minute, we could choose an isolator which has a static deflection of ¾ in. or go to 3 in. and more. In the former case, however, 35% of the original force would still be transmitted to the substructure whereas the force would be reduced to only 7% in the latter case.

It is evident from this table that low frequency disturbances and high vibration absorption require large deflections of the elastic medium. Deflections above ½ in. are difficult to obtain with organic materials unless one goes to complicated constructions. Therefore, cork, rubber, and rubber-like materials have a definitely confined region in which they can be used. If correctly applied these materials will perform very well indeed, especially if the large amount of internal damping which they possess is usefully employed.

How important a consideration of these factors is, may be gathered from the following most unusual experience. Two 3-cylinder 4-cycle Diesel generator sets, operating at 450 rpm., were going to be installed in a hotel. The two engines with generators, including foundation, weigh approximately 110,000 lbs. On account of the existing vertical and horizontal unbalanced couples, it was contemplated to isolate the foundation pit against vibration transmission by means of cork on the bottom and sides.

Vibration engineers who were asked for advice definitely rejected the idea of using cork because mathematical calculations indicated that in accordance with figure (1), vibration transmission may be greater than that of an unisolated foundation.

It was, therefore, decided to build the foundation in such manner that steel spring isolators could be installed later on in case vibration troubles developed. This was done in order to keep the initial cost as low as possible. Operation of the engines demonstrated the wisdom of this decision. Vibration transmission was so severe that it was impossible to operate the engines. Steel spring Vibro-Isolators were installed without a single change in the foundation. The results are best described by the words of the Diesel manufacturer's engineers:

"We are pleased to advise that we have installed Vibro Dampers on the engines, and the units have been placed in permanent operation. As you remember, we were plenty worried about vibration on this installation; however, it appears that our worries are now over as we are unable to detect the least amount of vibration. . . . We realize that the advent of spring mounting on Diesel engines will open a vast field for Diesel engines in hotels, office buildings, etc. Heretofore we have been reluctant to give much credit to the mounting of Diesel engines on springs and rubber; however, we know just what the springs will do from our actual experience in this case."

Steel springs, particularly of the coil spring type, readily provide the large deflections necessary for low frequency disturbances. They may be adopted to practically all types of installations since their elastic qualities can be accurately predetermined and controlled through many combinations of spring dimensions and proportions. Failures of springs and loss of resiliency from fatigue are practically nonexistent because the endurance limit and stress may be so specified as to have a safety factor far exceeding the requirements of actual operation.

Unbalance and other inertia forces have the tendency to upset the equilibrium of the machine system, free forces tending to move it in a transilatory direction and free moments in a rotational direction in the three-space axes. It is, therefore, necessary to design any spring suspension in such manner that the desired frequency ratio referred to previously is obtained for all "six degrees of freedom" within which a freely swinging body may move. It is particularly important for all reciprocating machines that the six frequencies are closely bracketed. Passing through resonance when starting and stopping an engine will then become a simple matter causing but a slight and quickly disappearing increase in oscillation. Absolute safety is obtainable with a correctly designed spring suspension as indicated by thousands of successful installations.

Of the many interesting installations, the author likes to cite an experience with a 450 hp. two-cycle Diesel marine engine operating at a maximum speed of 250 rpm. and direct connected to a 4-blade steel propellor. The engine, instead of being bolted rigidly to its foundation, is mounted on steel spring Vibro Isolators with a flexible coupling interposed between the engine and the thrust bearing. From the author's own observation, oscillation, when passing through resonance, did not exceed 10/1000ths of an inch which was reduced to less than 5/1000ths of an inch at normal operating speeds while oscillation of about 3/1000ths of an inch in direction of rotation disappeared completely.

Figure 3 is a record of a typical case showing the amplitude of motion of a Diesel engine from the time it starts, passes through resonance, and attains operating speed.

All spring suspended systems show an oscillation greater than that of a rigidly mounted system as shown in Figure 4. The operating amplitudes are all compared with the "ideal system" which by definition is a system suspended in space and provided with an infinitely elastic suspension. Its amplitude is the minimum obtainable and is constant over the entire range. For the actual engine, in comparison, amplitudes are small but vibration transmission great for the low frequency ratios, gradually increase through resonance, and finally approach the amplitude of the ideal system. The amplitude of any system can be reduced to a minimum not to be in excess of 2/1000 inch by increasing its mass, usually provided in the shape of a foundation which thus acts as an excellent stabilizer.

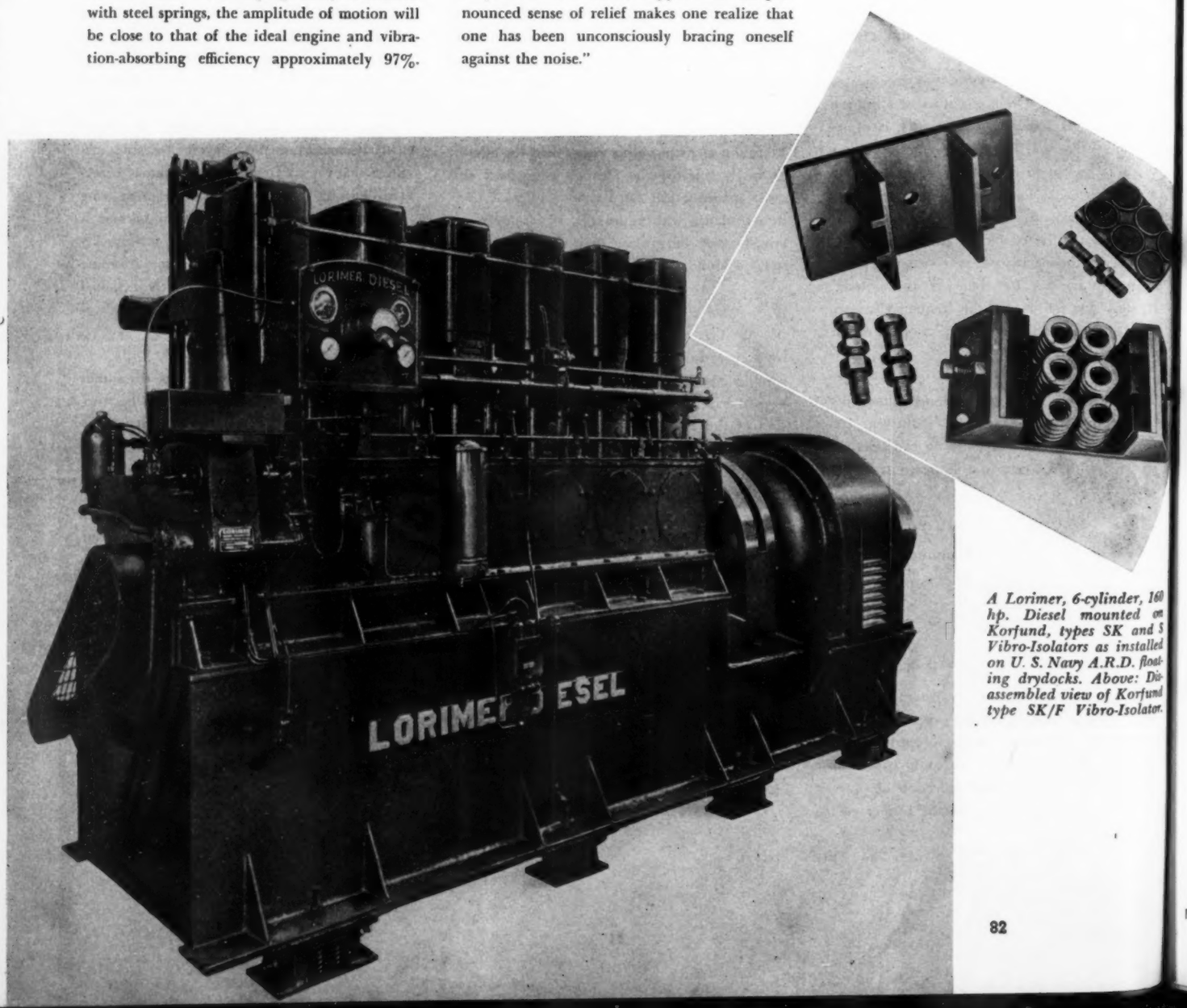
It is evident from the statements made in this paper that vibration isolation of 100 per cent with no oscillation of the operating system is impossible. However, for a frequency ratio of 5:1 and with zero damping, easily obtainable with steel springs, the amplitude of motion will be close to that of the ideal engine and vibration-absorbing efficiency approximately 97%. This means that the motion of the mass would be virtually imperceptible and that the slight vibration transmission would be well beyond the human sensitivity range, hardly detectible even by the finest instruments.

Improved Health of Workers

There is no disagreement among medical men that vibrations have a pernicious influence upon the nervous system of human beings. Continuous vibration results in fatigue of the body, and reduced perception of the worker, and is one of the major causes of accidents. The harmful effect of noise upon our physical wellbeing is appreciated. We all have experienced it especially when our condition is below par. Its general physiological aspects are beyond the scope of this paper, though a serious habit of our system may be emphasized—that of becoming apparently accustomed to the ravages of noise. G. W. Kaye before the Royal Institution of Great Britain, May 8th, 1931, stated: "It is only when the noise is stopped that the pronounced sense of relief makes one realize that one has been unconsciously bracing oneself against the noise."

The operation of machinery, as we have seen, invariably causes vibrations. Quite frequently they may not be felt in the immediate neighborhood of such machines but appear some distance away in an amplified intensity. When they cause disturbances of such a nature as to materially interfere with the operation of a neighboring plant, or to become so annoying to human beings that they constitute a nuisance, an action to enjoin the use of the offending machinery may be started and, according to many recorded court decisions, carried through successfully; or as one court decision stated it, "Community vibrations must be endured, but vibrating a community is a nuisance."

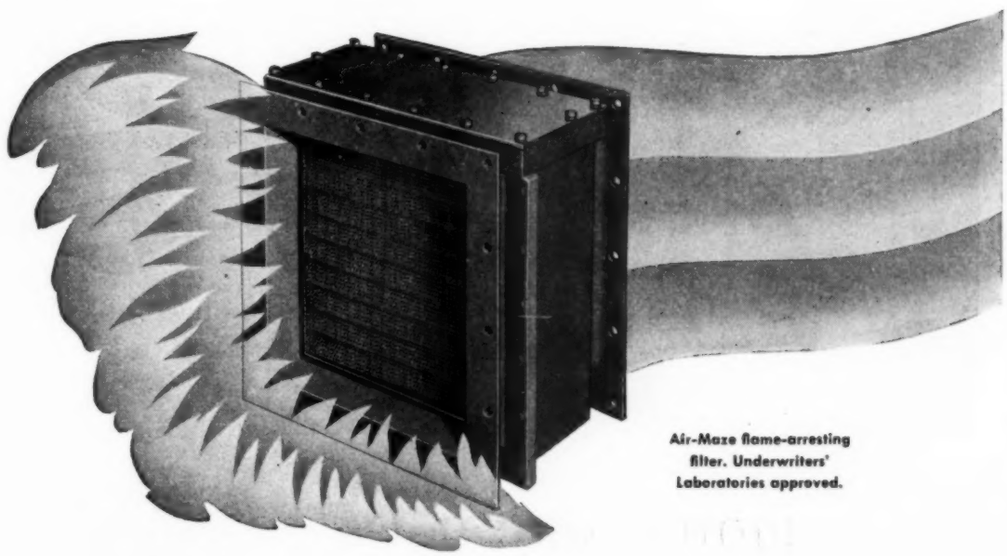
There is no denying that great material benefits are derived from vibrationless and noiseless operation of machines. Yet, even if these benefits did not exist, our moral obligations toward mankind dictate a determined attempt toward vibration control.



A Lorimer, 6-cylinder, 160 hp. Diesel mounted on Korfund, types SK and S Vibro-Isolators as installed on U. S. Navy A.R.D. floating drydocks. Above: Disassembled view of Korfund type SK/F Vibro-Isolator.

WHEN ONE EXPLOSION CAN BREED ANOTHER...

THIS "SNUFFER" KEEPS FLAME FROM SPREADING



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K-3853

DIESELS BUILD KANAWHA AIRPORT

THE views above show construction of the Kanawha Airport in the sandstone hills near Charleston, West Virginia. The job involves 5,000,000 cubic yards of excavation, laying of 3 blacktop runways, 5000 ft. and 6000 ft. long and 150 ft. wide. A large fleet of Caterpillar Diesel tractors with scrapers, wagons, bulldozers, tampers and rippers, also motor graders are at work on this huge project. Right is R. Truzzie, superintendent for Harrison Construction Company, general contractor on the job.

LEGAL NEWS

By LEO T. PARKER*

REVIEW 1944-45 LAW SUITS

City Sells Diesel Power Plant

CONSIDERABLE discussion has arisen from time to time over the legal question: Do the terms "materials," "supplies," etc. include electric current, water or gas, which requires municipalities to comply with state laws specifying that purchases must be made from "lowest bidder"?

The answer to this question of law is particularly important when a municipality intends to sell its electric, gas or water Diesel engine power plant and purchase electricity, gas, or water from a private corporation.

For illustration, in Mullen v. Town of Louisburg, 33 S. E. (2d) 484, reported June, 1945, it was shown that a state law provides that no county, city, or town shall award a contract for the purchase of materials or equipment, requiring an expenditure in excess of $1,000, except to the lowest responsible bidder after due advertisement as provided in detail by another section of the law. It was shown that a municipality owns and operates an electric light plant for the benefit of its citizens. Diesel engines furnish the power necessary to generate the required electricity. The plant has paid the cost of its operation and in addition has contributed a substantial sum to the town treasury.

For years citizens have advocated a change of policy. They proposed that the municipality cease generating its electricity, and in lieu thereof purchase wholesale the required supply of electric current from a power company. Recently the city council passed an ordinance granting the power company a franchise to use its streets to transmit and distribute electric energy, at specified rates. Also, the city officials gave public notice that it would offer three of its four Diesel engines for sale at public auction to the highest bidder.

Soon afterward a citizen instituted suit to restrain the sale of the Diesel engines, the granting of the proposed franchise, and the purchase of electric energy wholesale from the power company for redistribution. In his suit he alleged that the sale of the engines constitutes a sale of its light plant and is unauthorized and unlawful until and unless approved by vote of the electorate of the city. The higher court refused to agree with this contention, saying:

"It is conceded that the proposed contract for the purchase of electricity involves a sum in excess of $1,000. Is the purchase wholesale of electric current from a public utility for redistribution through the defendant's (city's) local plant a 'letting' of a public contract for 'supplies' within the meaning of the Act? . . . The better reason dictates the conclusion that the statute applies *only* to contracts in relation to supplies and materials where the bidders have the right to name the price for which they are willing to furnish the same."

Also, with respect to legal authority of the municipal officials to grant a franchise and sell the Diesel engines, this court said:

"It is a general rule that officers of a municipal corporation, in the letting of municipal contracts, perform not merely ministerial duties but duties of a judicial and discretionary nature. . . . The courts may not interfere with the exercise of the discretionary powers of local administrative boards for the public welfare 'unless their action is so clearly unreasonable as to amount to an oppressive and manifest abuse of their discretion'."

Fair Labor Standards Act

There is no deep mystery about the Fair Labor Standards Act which is applicable to employes who process, or handle merchandise in interstate commerce. It provides that a "work" week shall consist of forty hours between certain dates and forty-two hours between certain other dates and that when an employe works more than that number of hours in a week he must be paid one and one-half his regular wage per hour. The law also provides that if an employer fails to pay an employe time and one-half for overtime, such employer shall pay the employe double the wages due, plus attorney's fees. It is important to know, however, that the law requires the employe to prove *positively* that he worked *more* than the maximum hours in any week. His failure to prove these facts entitles the employer to a favorable verdict.

For instance, in Stewart v. Mabee Company, 147 Pac. (2d) 731, reported June, 1944, an employe sued his employer for back wages, overtime, and lawyer's fees under the Fair Labor Standards Act. However, the employe failed to prove when he worked overtime and how many extra hours he had worked. Therefore, the higher court refused to hold the employer liable, and said:

"Judgment in a case under the Fair Labor Standards Act cannot rest upon guess, speculation or suspicion. It has been said many times that in order for a plaintiff (employe) to recover under the Fair Labor Standards Act he must prove his case with reasonable certainty." Another important new higher court decision on this subject of law is Walting, 148 Fed. (2d) 768, reported June, 1945.

The facts of this case are that an employer required prospective employes to work as "trainees" without wages, specified by the Fair Labor Standards Act, until they were appointed as regular employes. A suit was filed by the Government to compel the employer to pay the trainees wages specified by the wage law.

The higher court refused to do so and said that trainees who are privileged to work when they please are not under the jurisdiction of the Fair Labor Standards Act.

Service Men Must Use Care

It is well established law that all employes of Diesel engine service companies are legally obligated to exercise "ordinary" care to safeguard property on which they work while servicing an engine. On the other hand, no property owner may recover damages from a Diesel engine service company for alleged damage to property unless *positive* testimony is given that the service men *negligently* caused the damage.

For instance, in Moose Company v. Eastern Tractor & Equipment Company, 29 A. (2d) 167, it was disclosed that a building burned after service men left it. The owner of the building sued the employer of the service men to recover the value of the building and its contents, including a Diesel engine.

. . . . *And now please turn to page 94* . . . .

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* *Attorney at Law, Cincinnati, Ohio*

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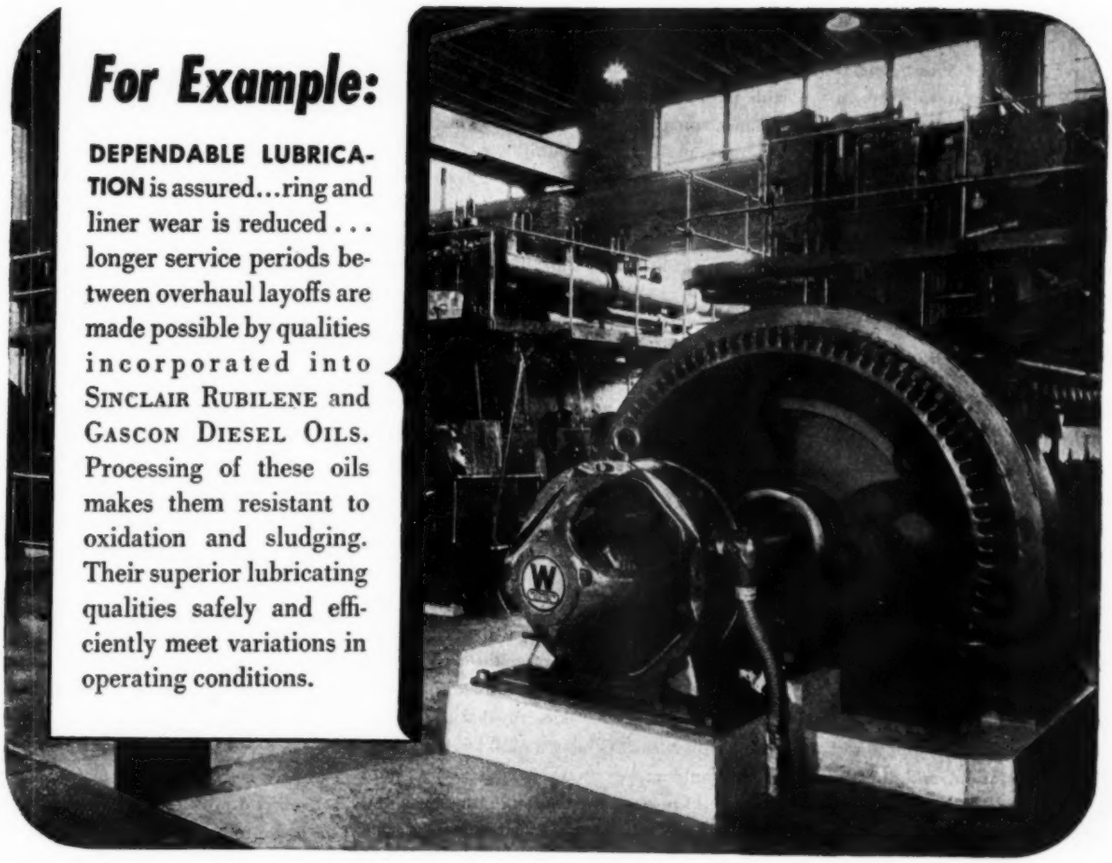

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SUPERVISING & OPERATING ENGINEERS' SECTION

"Factors Contributing to Operating Costs"

Conducted by R. L. GREGORY*

ALL supervisors and engineers are interested in operating costs, and since we are all aware that the factors contributing to these costs are legion, it will be the purpose of this series of articles to analyze and discuss these factors from various angles. However before going into the subject, there are a few general ideas that the writer wishes you to keep in mind since they are of vital import and have a bearing upon the subject.

First: Every power plant, whether its prime movers are Diesel, steam, gas, hydro driven or are any combination of these units, that plant is an individual plant with its own individual problems. True, there may be some problems common to most plants, but all problems are not common to all plants.

Secondly: All plant operation is dependent more or less on two conditions, the first of which is more or less uncontrollable as far as the plant itself is concerned and consists of the load demand on that plant, the second condition, more or less controllable being the capacity, availability, equipment, fuel, lubricants and personnel; this second condition being more or less dependent upon the first.

Thirdly: Since we are primarily interested in Diesel operation, the discussions to follow will be confined to Diesel operation, and for the sake of example and argument let us consider a Diesel plant of average size with a load demand of 5000 kw.

There has always been a point of contention between consulting, designing and operating engineers over the question of the proper size of units to install in power plants—as to whether it is better to install several medium sized units, or put all your eggs in one basket and go all out for the larger types of engines. Both sides of the question have their advantages as well as their weaknesses. To start with, an ideal plant is one which has a capacity equal to from 75 to 100 per cent capacity beyond its normal load demand. However a great many plants are not fortunate enough to be so equipped. Let us assume that the above mentioned plant with a 5000 kw. load demand has a total capacity of 10,000 kw., and consists of four large units, each driving a 2500 kw. generating unit.

Now this would be an ideal condition, providing these units were standardized, that is, all of the same make and design with interchangeable parts. That would be ideal from the maintenance cost point of view, since a complete set of spare parts for one unit would be interchangeable with the other. However with a normal load demand of 5000 kw. it would be folly to try to operate that load on two units, operating at full rated capacity, hence the third unit would be required and the load split up proportionately among the three units.

On the other hand what about operating efficiency when each unit would be carrying less than three quarter load? Most large Diesel units operate more efficiently above three quarter load than they do below it and this is the argument presented by engineers who favor the operation of several smaller units, or a plant with varying size units, part large and the rest of smaller capacity. For example take this plant with a 5000 kw. load demand, and instead of having the four large units each driving a 2500 kw. unit, install two of these units and have the other 5000 kw. divided into four smaller units each driving a 1250 kw. generator. This would make a very flexible setup, since they could operate the two large units at about 2000 kw. each, and one small unit carrying 1000 kw. and all three would be operating at a good efficient point, and still have three units of 1250 kw. capacity as standby.

Now someone will say, "Yes, you might operate more efficiently with such a setup, but you would have six units to maintain instead of four for the same capacity." That is true, but with greater plant flexibility and more efficient operation of the units in service, it would offset the extra maintenance of the other two units.

Now in making this statement, the writer is not criticizing the installation of large units. But it is highly desirable to have plant flexibility and to keep your units operating at the most efficient point at the same time. So each unit is adaptable to the condition for which it is designed and "standardization" does cut costs as will be pointed out later in this discussion.

Liners and Pistons

Supervisors and engineers are often in a quandary as to just how much wear should be allowed on a liner or piston before changing or reconditioning. However it seems to the writer that the decision on this point should be in the affirmative when the efficiency of the unit falls below normal to any great extent and the cause can be traced directly to wear of liner or piston, and cannot be remedied by mechanical changes, such as adoption of special rings, honing, etc. Here again is a bone of contention among many engineers. Some feel that it is folly to pull and discard liners which can be rebored and a set of oversized pistons and rings installed. Others feel that it is absolutely out of the question to rebore a liner and fit it up with an oversized piston. To the writer that all depends upon the size of the unit, plant conditions and the cost incurred along with life expectancy from the reconditioned liner.

In the case of an isolated unit of small bore, where the liner does not have to be removed from the cylinder to rebore and a good workmanlike job can be accomplished it might be satisfactory, especially after the original liner has given several thousand hours operation and there is still plenty of material to make a good job and give long life expectancy to a rebored job. However I do not approve of it in plants where there are several units of "Standardized" size and make as you then have destroyed your standardized setup as you have a mongrel unit with oversized liner and piston.

The average wear on a liner or piston which is properly lubricated and operated should not be over .003 in. for every 1000 hours of operation and this should be maximum. If the wear is greater than this, the cause should be traced down and remedied. It must be remembered that the less cylinder wear per 1,000 hours of operation, the longer the liner will last and the cheaper the maintenance and operating cost per 1000 hours operation. And after all that is what we are interested in. This discussion will be continued in the next issue of DIESEL PROGRESS.

* *Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.*

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Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

"Repairing a Cracked Liner"

EVERY now and then, an engineer submits his idea on repairing cracked liners. Recently we received a letter from G. L. Klock, Chief Engineer of the Bath, N. Y., Municipal plant in which he explained the method which they used and we are therefore passing it on to our readers.

"Each month, we read with interest, the Exchange Maintenance Idea Section of DIESEL PROGRESS, and have profited by the ideas set forth and other Engineers' experiences.

"I am enclosing a simple and inexpensive method we used in repairing a crack in a 13¼ in. x 17½ in. Diesel engine liner. Figure 1 shows where the crack developed, in two places at the top of the liner, the total length of the two cracks being about half the circumference. We marked off the circumference at approximately 3 in. spacings, on the side of the liner and drilled holes ¾ of an inch deep with a 17/32 in. drill, and an additional ¾ in. depth was added with a 7/32 in. drill, and an additional ¾ in. depth was added with a 7/16 in. drill, the total depth of the hole being 1½ inches. We then tapped out the bottom half of the hole for ½ in. cap screws, using ½ in. x 1½ in. cap screws dipped in a smooth-on solution.

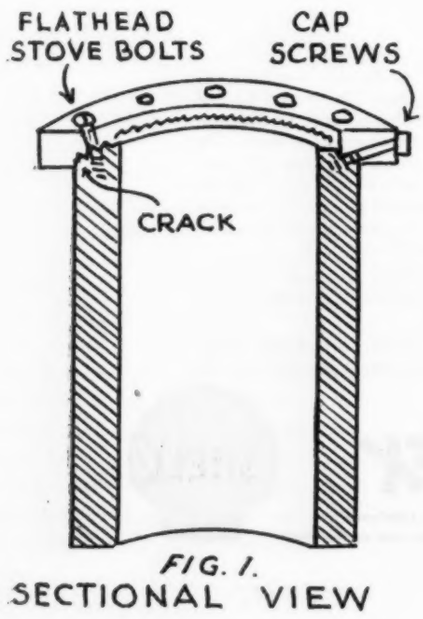

FIG. 1.
SECTIONAL VIEW

"We then drilled the top of the casting in the same manner, except that the bottom hole was drilled and tapped for ⅜ in. stove bolts. Here we used ⅜ in. x 1½ in. flat head stove bolts, countersinking the heads, so that they would not interfere with installation of the cylinder head on the liner. This arrangement is shown in Figure 2.

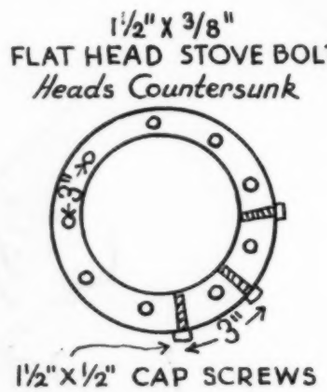

FIG. 2.
TOP VIEW

"Our first attempt at making such a repair was made in June 1941, and this liner is still in use and has never leaked. Since that time we have repaired two or three others in the same manner, one of them being cracked all the way around. We have also repaired a 10¾ in. x 13½ in. liner in the same manner and it appears to me that this type of repair could be made on almost any size liner with good results.

"We found that the cause of our liners cracking in this manner was due to the fact that the heads were pulled down too tight, there being no copper gasket between the heads and the liners. We now use copper gaskets which does not require our pulling the heads down as tightly as we were forced to do when we had a metal to metal fit. I feel that this suggestion might be of value to some other engineer experiencing the same trouble."

Mr. Kloth's suggestion, along with the fact that these liners have continued to give service for many months without further leaking, is a good one, and possibly could be used on larger sized liners, by using heavier cap screws and countersunk bolts. That is, as long as the crack appears in the position shown, at the top of the liner where there is sufficient metal to make such a repair without weakening the liner.

It is true, that a liner or even a cylinder head can be easily cracked by tightening the cylinder heads too tight, especially where the joint between the cylinder head and liner is a metal to metal fit. The use of a good copper gasket at this joint is highly desirable and many manufacturers of Diesels now use a tongue and groove joint at this point, with the copper gasket inserted in the groove. Even at that care must be taken when installing the heads to see that the tongue sets squarely in the groove and when tightening down the heads that they are pulled down squarely on the gasket in the groove. It is always well to use a good coating of either white lead and oil on this joint, or give the gasket a coating of permatex or glyptal.

"Care of Pistons and Cylinder Walls"

SUPT. C. G. Hilleary of the Villisca, Iowa, Municipal Power plant, has written as follows on the above subject:

"Covering a period of better than twelve years of handling Diesels, I have observed the pulling and inspection as well as the reconditioning and cleaning of many pistons and I just can't agree with many maintenance men on the manner in which this work is done, and wish to express my method of doing this work.

"The old adage that 'Cleanliness is next to Godliness,' certainly applies in the care of pistons and cylinders. In our plant we pull the pistons after approximately 2500 hours of operation, as I have found that the only way to tell the exact conditions of pistons and cylinder liners is to pull the pistons and make a thorough inspection.

"When we pull a piston, we remove all the rings, so that the ring grooves can be thoroughly cleaned as well as the rest of the piston. We use 2/0 emery cloth which has been soaked in good clean fuel oil. We then go over the entire piston, always keeping plenty of fuel oil on both emery cloth and piston. The piston is then wiped with a clean dry wiper for inspection. We continue with these operations until all varnish, carbon, etc., is entirely removed

. . . . *And now please turn to page 126* . . . .

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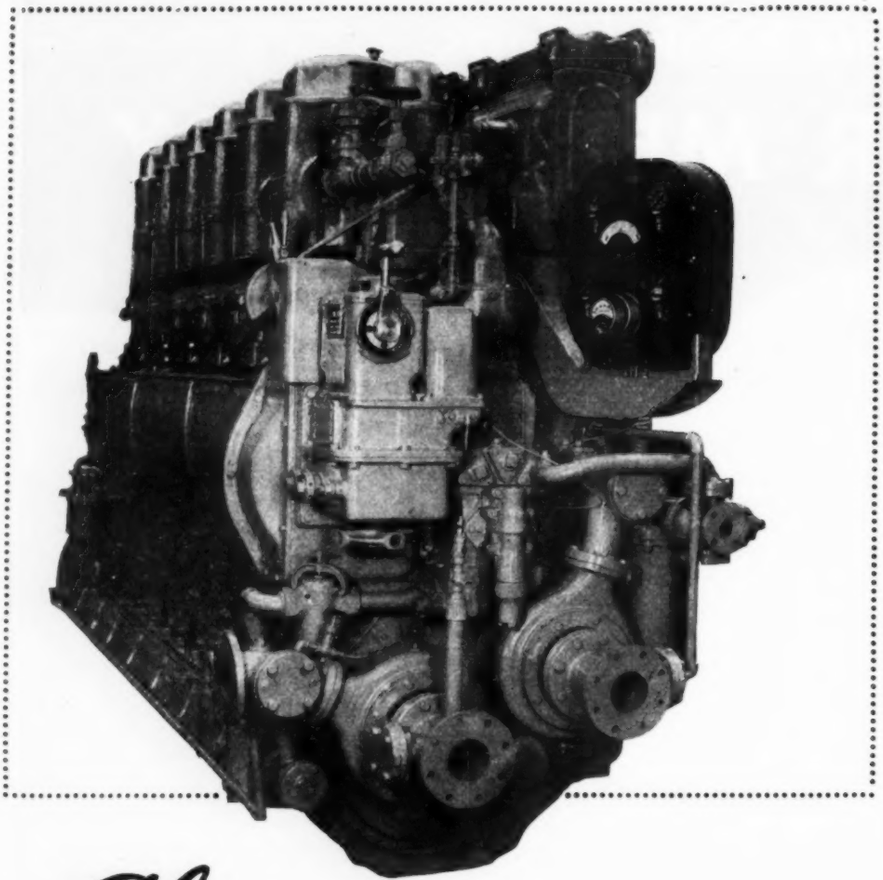

Alnor Pyrometers

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High-powered Enterprise Diesels of the turbo-charged type are equipped with Alnor Exhaust Pyrometers, providing a reliable check on operating temperatures. With these engines the inlet and outlet temperatures of the exhaust gas turbo-blower are of equal importance with cylinder exhaust temperatures. Alnor Exhaust Pyrometers provide for a simple, convenient installation and assure reliable temperature indications. These temperatures are of great importance as a guide to uniform loading and continued high efficiency performance of the engine.

There is an Alnor Pyrometer to meet the needs of any type of engine, large or small. Write for bulletins with complete descriptions.

ILLINOIS TESTING LABORATORIES, INC.
420 North La Salle Street
Chicago 10, Illinois

Legal News *Continued from page 86*

During the trial it was proved that the property owner maintained and operated a Diesel engine, housed in one of several closely grouped buildings of wood and wood-frame and sheet-metal construction. One day trouble with the engine developed and a Diesel service company was requested by telephone to provide a competent workman to overhaul the engine, and to supply whatever parts were necessary to put it in good operating condition.

The owner of the building contended that the workmen employed by the service company caused the fire by negligently leaving a blowtorch when they went to lunch so that fire spread from it. However, the owner of the building failed to prove these contentions. Therefore, the higher court refused to hold the service company liable, and said: "Either of these theories presents nothing more than conjecture, and conjecture is not proof."

American Locomotive Appoints John Seagren Chief Engineer of Diesel Engine Division

AMERICAN Locomotive Company announces the appointment of John Seagren as Chief Engineer in the Diesel Engine Division at Schenectady, N. Y.

John Seagren

Mr. Seagren worked with Fairbanks-Morse and Company from 1925 to 1932, specializing on Diesel engines and air compressors as a Design Engineer until he became Development Engineer in the Research and Development Department. In 1932 Mr. Seagren joined the Atlas Imperial Diesel Engine Company as Development Engineer in charge of Experimental and Development work. He became Chief Engineer in 1936, assuming full charge of all experimental work and engineering in both the Oak-

. . . . *And now please turn to page 96* . . . .

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THE FLUOR SPARK ARRESTER MUFFLER catches hot particles in the exhaust stream before they leave the Ejector Cone and enter the stack. A centrifugal action imparted to the exhaust stream by special design throws these particles outward and downward against the muffler walls into a collecting chamber. The action is automatic... provided by exhaust gas energy. Exhaust gases then pass through the Ejector Cone free of practically all particles that might become sparks. Easy access for removing accumulated matter is provided by a clean-out door. In addition, the FLUOR SPARK ARRESTER MUFFLER gives you all the many other exclusive advantages of Fluor *Air-Cooled* Mufflers, including ventilation, heating and cooling, elimination of insulation, no smoking, longer life and lower main tenance cost.

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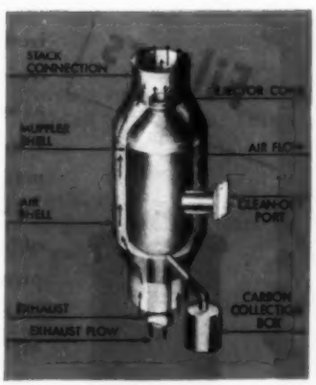

(All designs for Fluor *Air-Cooled* Mufflers are protected by U.S. Patents and Patents Pending)

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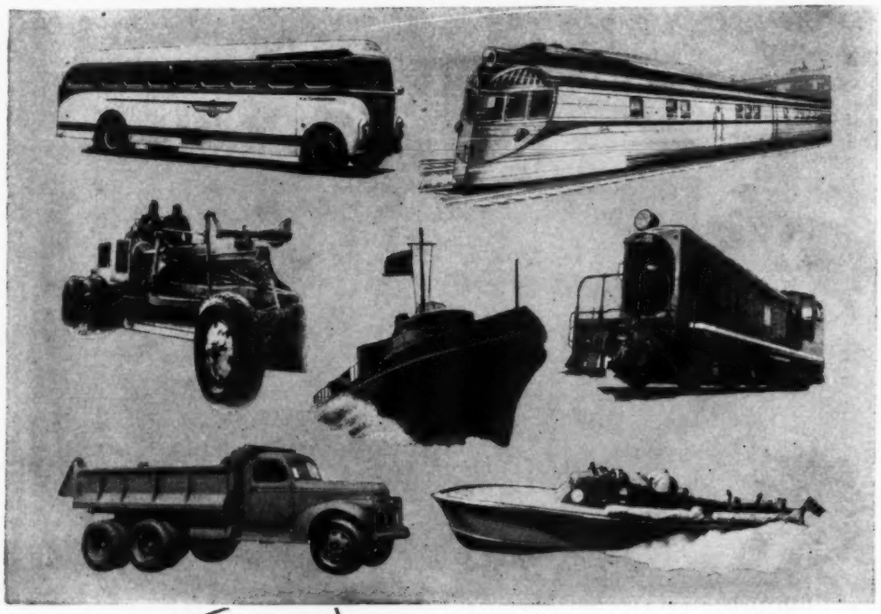
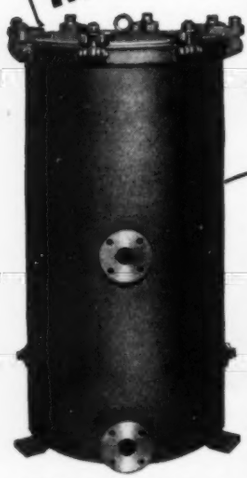


MICHIANA Oil Filters



ABOVE: MICHIANA (Diesel) Oil Filters are made in capacities to 3266 h.p.

RIGHT: MICHIANA (Gasoline Engine) Oil Filter. Both types can be serviced with Replaceable Cartridge Element or furnished with Repackable type Element.

New Illustrated Bulletin 45-D contains complete details and specifications on Diesel engine filters. Write for your copy today.

Selected on merit by leading engine and equipment builders, MICHIANA Filters serve on engines all over the world. With the U.S. Fleet, on thousands of vital motorized military units, on the finest streamliner trains, on trucks, farm machinery as well as with stationary equipment, MICHIANA Filters are saving fuel and oil and cutting maintenance expense.

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MICHIANA OIL FILTERS

. . . . *Continued from page 94* . . . .

land, California and Mattoon, Illinois plants. Mr. Seagren joined the Northern Pump Company of Minneapolis as Development Engineer on Postwar Production in May, 1944 and remained in this position until July, 1945, when he joined American Locomotive Company.

Rogers Diesel Appoints Frank B. Carbone

THE Rogers Diesel and Aircraft Corporation announces the appointment of Frank B. Carbone as assistant to its President, Ralph B. Rogers.

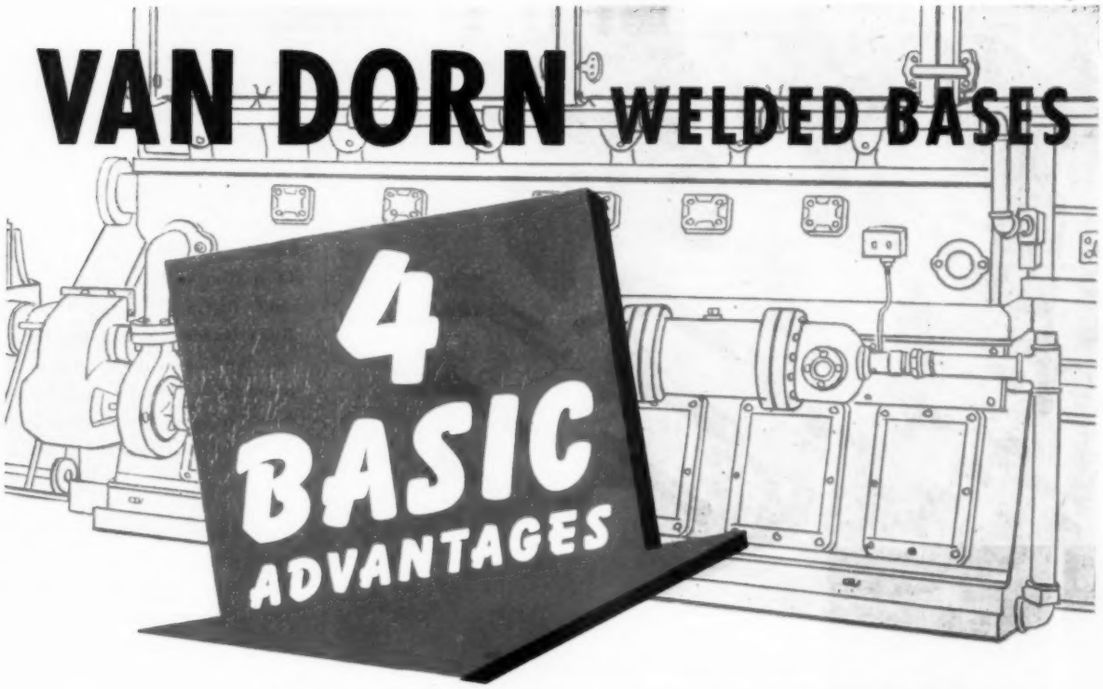
Frank B. Carbone

Mr. Carbone has been associated with the Colonial Sand and Stone Corporation, and its affiliates, for the past nine years as Vice President. His duties there were chiefly administrative and included directing real estate matters, purchasing and maintenance procedure.

Thompson Products Appoints Richard Freund

THE appointment of Richard Freund as sales engineering representative for its West Coast plant was recently announced by Thompson Products, Inc. With headquarters in Detroit, Mr. Freund will handle sales and engineering problems regarding large engine valves, seats and guides working direct with engine manufacturers in the north-eastern United States. Mr. Freund has had extensive experience in this field with the Opel Works of General Motors in Europe and recently as Technical Supervisor with Detroit Diesel Engine Division of General Motors.

VAN DORN WELDED BASES



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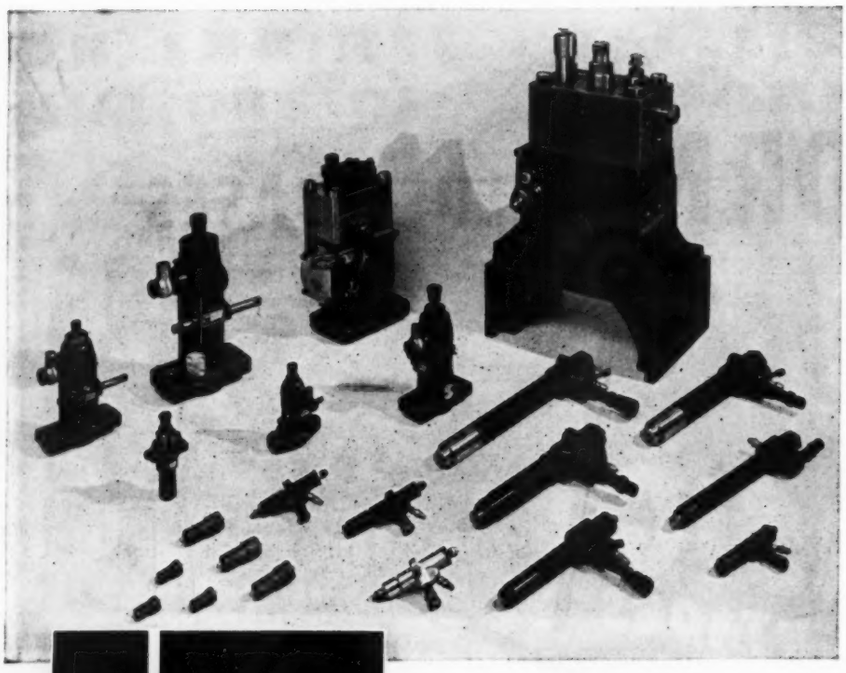

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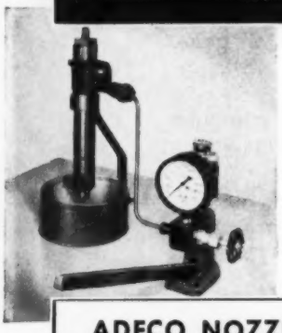

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Lube Oil Reconditioning Pays Large Dividends

AN estimated saving of 44 thousand dollars per year in the operation of 14 large cranes, through the successful adoption of adequate oil conditioning, is shown by records from the files of a well-known engineer in charge of mechanical equipment at one of the big West Coast shipyards. Oil consumption was cut from approximately 18,000 gallons per year down to approximately 6,000 gallons, and the full-time labor of five men was saved through the use of lubricating oil conditioners. Other benefits include the fact that the 200 hp. Cummins and Buda Diesels which power the cranes are now showing a remarkable degree of efficiency by operating without overhaul for periods of 16,000 hours, or more. Previously, overhaul schedules called for "time down" every 10,000 hours or less.

Troubled by the fact that a five-man crew was required on a full-time basis merely to change the oil in the engines of the 14 cranes every 150 hours, and that waste oil was disposed of at the rate of 1,000 gallons per month, this engineer installed high capacity industrial-and-marine type Winslow Oil Conditioners on a test group of four of the cranes. Results immediately justified similar installations on the remaining cranes.

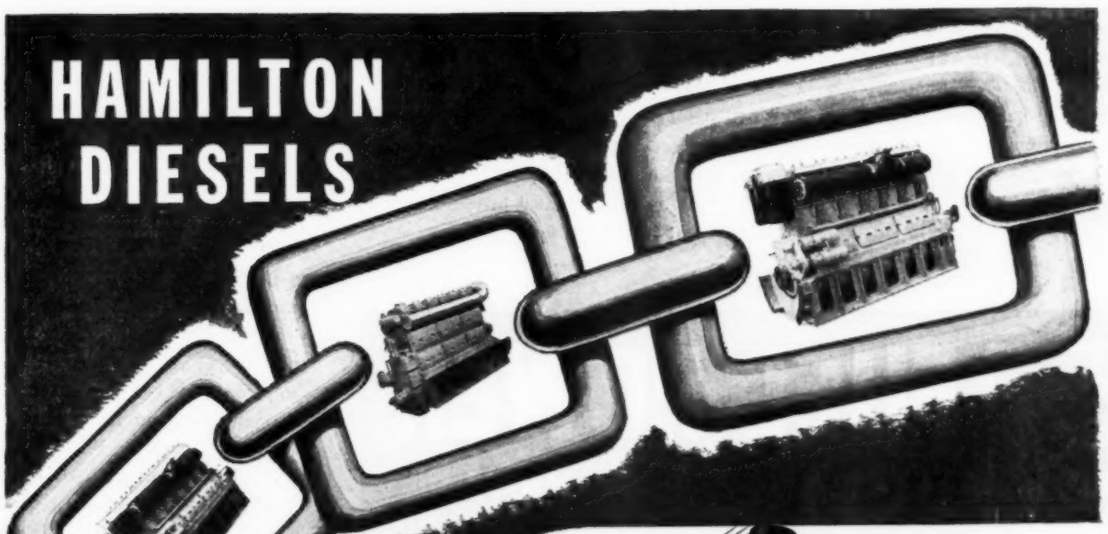
Now, oil is changed only after 500 to 650 hours of operation on each of the engines. Filter elements are changed at this time, but flushing oil which was previously used is no longer necessary. Waste oil disposal has dropped from approximately 1,000 gallons per month to an average of about 166 gallons per month, a cut of 83%, at an estimated saving of about $6,000 per year.

Oil changes are now handled by the men who clean and oil the cranes while the cranes are tied up. Estimated labor cost savings amount to about $38,508 per year. Added to oil savings, this comes to $44,508 per year. Against this alone, the oil conditioner installation costs are considered negligible.

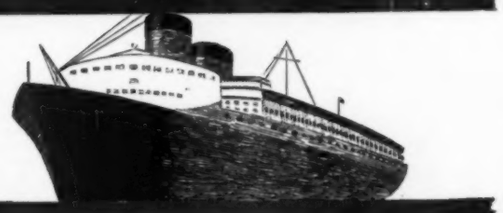
Pesco Publishes Two New Bulletins

BULLETIN No. 11, titled "Pesco Hydraulics for Tractors and Industrial Applications," also Bulletin No. 101, titled "Pesco High Pressure Gear Pump for Industrial Use" have just been published. These informative engineering bulletins may be secured on request to S. E. Voran, Advg. Mgr., Pesco Products Co. (A Division of Borg-Warner), 11610 Euclid Ave., Cleveland 6, Ohio.

HAMILTON DIESELS

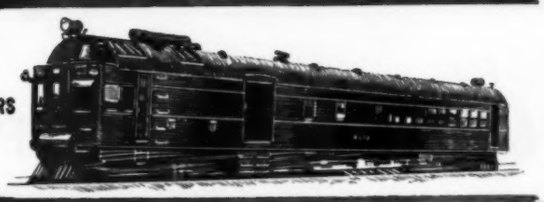


MARINE

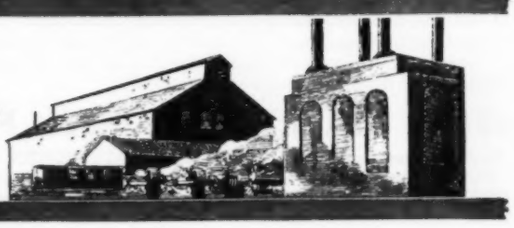


CENTRAL STATIONS

RAILCARS



FACTORIES



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New Brochure on Industrial Engine Valves

AN interesting and informative brochure on large engine valves has just been published by Thompson Products, Inc. Handsomely illustrated in two colors this brochure takes you through manufacturing processes, selection of materials and precision finishing and inspection of the larger sizes of engine valves, valve guides and connecting rod bolts. A section is devoted to engineering particulars, on the installation and maintenance of valves, seats and guides. You may secure a free copy of this helpful brochure by writing on your business letterhead to Thompson Products, Inc., Bell, California.

New Locking Nut Announced

THE Auto-Diesel Piston Ring Company announces a new product that can be advantageously used in many places. The Auto-Diesel Sealoc Nut has demonstrated in use as well as in tests that it will not loosen or back off. It will positively lock the threads to bolts and studs. It can be easily and quickly removed which is important in making repairs and for maintenance. They facilitate production and assembly and also reduce service calls to the minimum. A circular describing this new product in greater detail will be mailed upon request to the Auto-Diesel Piston Ring Company, 3233 Superior Ave., Cleveland 14, Ohio.

Herbert Willetts to Manage Socony-Vac Division

HERBERT WILLETTS has been appointed general manager of the Eastern Marketing Division of the Socony-Vacuum Oil Company, Inc., it was recently announced. The divisions comprising the company's Eastern Marketing area have headquarters in Boston, Albany, Buffalo, New York City, Philadelphia and Baltimore. Mr. Willetts succeeds John M. Martin, who, after 42 years of service, will retire late in 1946. In the meantime Mr. Martin will be available for special assignments, the first of which will be to place returning veterans in the company's marketing operations.

A native of Troy, N. Y., Mr. Willetts joined Socony-Vacuum after being graduated from Union College in 1923. He has in turn been assistant division manager at Buffalo and division manager at Philadelphia and New York City. He was promoted to assistant general manager of Eastern Marketing in March.

FULLER POWER FOR PEACE

For 85 years — as the world's oldest refiner — the makers of famous Be Square products have assisted in the development of many significant changes and improvements in the refining and manufacture of petroleum lubricants.

While furnishing high standard lubricants to our Armed Forces, Be Square perfected many new processes and manufacturing techniques to give the production of peacetime America finer, more efficient Diesel lubricants.

BE SQUARE HEAVY DUTY DIESEL ENGINE OILS

FULL Diesel power means MAXIMUM KILOWATT HOURS AT MINIMUM MAINTENANCE COST. For your Diesels to maintain such operating records, specify BE SQUARE HEAVY DUTY DIESEL ENGINE OILS — manufactured with IMPROVED ADDITIVES to resist ring-sticking, sludge, corrosion, scuffing and hard-carbon deposits.

Be Square lubricants are tested under high temperature operating conditions which determine their OXIDATION STABILITY, CORROSION CHARACTERISTICS, and OVERALL LUBRICATING VALUES. Many satisfied customers testify to the extra margin of protection assured by BE SQUARE DIESEL LUBRICANTS.

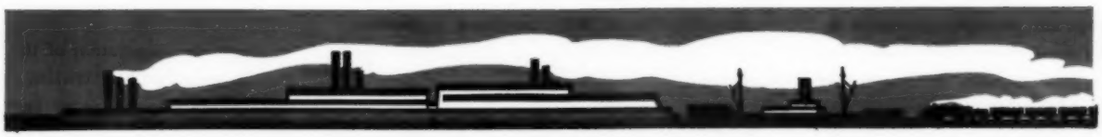
"BE SQUARE TO YOUR ENGINE"

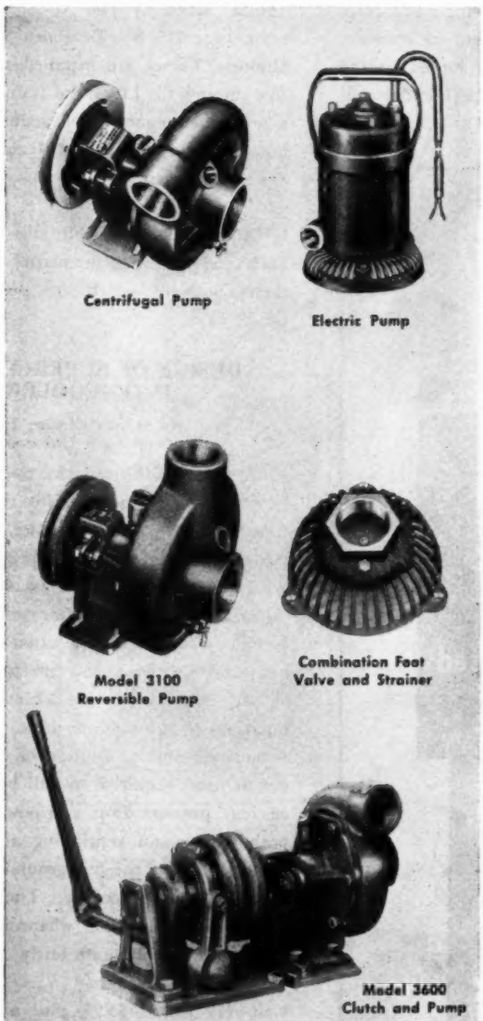
Consultation Service—
Our experienced engineering services are available to your plant management without cost or obligation.

BARECO OIL CO.
BOX 2009 TULSA, OKLA.
Barnsdall, Okla. — refineries — Wichita, Kansas

DIESEL PROGRESS Editorial Index

A COMPLETE index of all editorial material which appeared in the 1944 issue of DIESEL PROGRESS is now available. Included is a cross index of authors and articles. Feature articles are covered by title; news notes are indexed by names of manufacturers. No charge for this index. Address requests to DIESEL PROGRESS, 2 West 45th Street, New York, 19.





QUANTITY OUTPUT, uniformity of design and engineering simplicity make Marine Products equipment adaptable to a wide variety of industrial purposes. For soundly engineered reliability depend on Marine Products, designers and builders of pumps for special needs. Famous for world wide service records at low maintenance costs.

WE'D LIKE TO NAME YOU AS OUR CORRESPONDENT!

Industrial MP Marine
ENGINEERED EQUIPMENT
MARINE PRODUCTS COMPANY
6636 CHARLEVOIX AVE. • DETROIT 7, MICHIGAN

MARINE PRODUCTS' pumps and special devices are serving industry in a wide variety of ways, filling industry's needs for efficient, compact, adaptable products. Write us direct for information on how M-P can serve your field.

New Cleaning Aid For Evaporative Coolers

A NEW chemical development with lime solubilizing, fungistatic and detergent properties designed to inhibit slime growth and control formation of lime scale deposits in evaporative condensers and evaporative coolers is announced by Oakite Products, Inc., 22D, Thames St., New York 6. The material is a white powder, completely soluble, odorless and nontoxic. One ounce added to 10 gallons of makeup water in sump is said to keep water sweet, prevent slime and hard lime scale from forming on coils, keep equipment clean and minimize need for maintenance. A free 4-page Special Service Report fully describing application and giving further details is available on request.

Masters' Theses Now Available

MASTERS' Theses are now being made available to industry. Research data of immense importance, much of which is buried in the many departments of the Technical Schools and Universities, is being unearthed for the first time. They are being indexed by field of interest and subject.

Through the cooperation of the leading Technical Schools and Universities, Masters' Theses that are of importance to Industry and Research, will be indexed in the technical "Digest-Index" issued by The National Research Bureau, Inc., 415 No. Dearborn St., Chicago 10, Illinois. Theses are supplied only on microfilm through the Library of Industrial Research, a non-profit organization, acting as a clearing house for the exchange of Technical, Scientific and Management information.

A list of theses available will be sent gratis. Following are brief summaries of two typical theses both of which are pertinent to the Diesel field.

DESIGN OF SUPERCHARGER INTERCOOLERS

By Sidney Glaser, 1943
New York University

In the pages of this report is outlined an orderly, step-by-step procedure for the design of a tube-bundle type of intercooler. This design is the function of many variables, all of which are fully discussed. Some assumptions had to be made, and where these were obvious no further justification was attempted. The assumption involving the effects of L/D and W_v/W_e mass air ratio are accompanied by computations to substantiate them. The procedure is outlined for the solution of tube size, number of tubes required, overall heat transfer coefficient, pressure drop, and power required for both engine and ventilating air. The theory section presents the background and complete basis for that procedure. The method indicated, when applied to whatever experimental data was available, gave fairly close results.

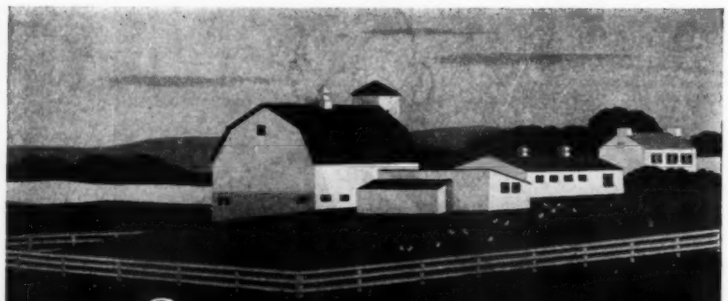
Cost—(79 pages)—$3.95, plus a service charge of $1.00.

PRACTICAL ASPECTS OF CLOSED CIRCUIT DIESEL ENGINE OPERATION ESPECIALLY AS APPLIED TO SUBMARINE PROPULSION

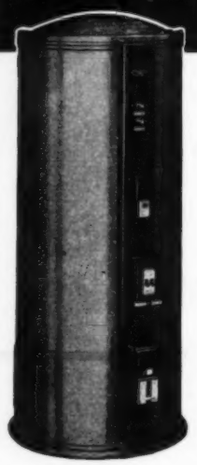
By Francis Masi,
Towne Scientific School, U. of Pa.

The feasibility of operating the Diesel type engine in closed circuit by a process of re-oxygenating the exhaust has been investigated. The practicability of such a system would, in a stroke, cut the specific weight of the power plant to a value in the neighborhood of 15 lbs. or less per horsepower. This great saving in

. . . . *And now please turn to page 108* . . . .



15¾ acres of purifying surface in every pound of fuller's earth used in a HONAN-CRANE PURIFIER



THE exceptional filtering capacity of Honan-Crane Purifiers is due in large part to Honan-Crane's ability to use loose fuller's earth as the filtering medium. A Honan-Crane Purifier for an average size Diesel would contain approximately 88 lbs. of fuller's earth, providing 1,386 acres of filtering surface.

The highly successful performance of Honan-Crane Purifiers is attributable to their unusually great filtering capacity, plus the fact that fuller's earth is the best known medium for the *complete removal of all types of damaging contamination from lubricating oil.*

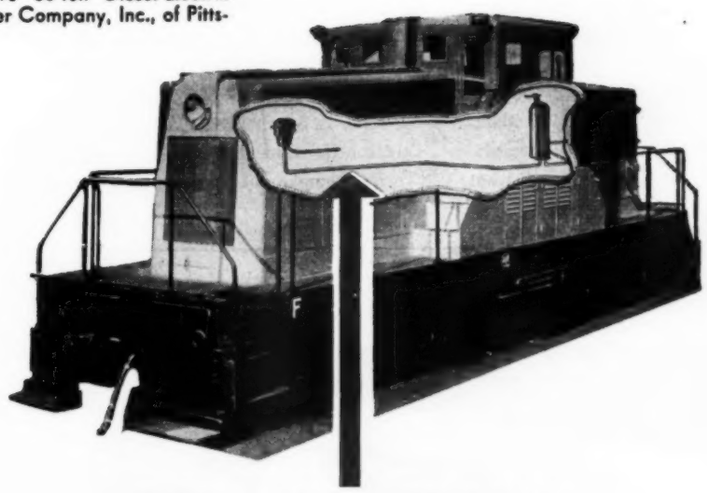
Honan-Crane Purifiers, using fuller's earth, will remove the most microscopic solid and will also completely remove acids and other forms of soluble contamination.

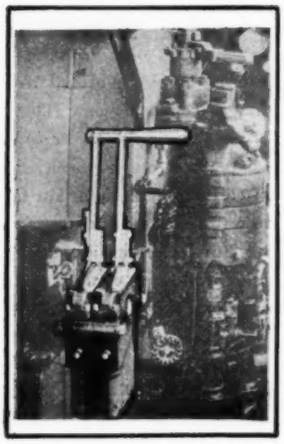
Write for engineering and equipment bulletins giving complete specifications on Honan-Crane Purifiers for Diesel or any other kind of industrial oil.

HONAN-CRANE CORPORATION
600 Indianapolis Avenue, Lebanon, Indiana

Subsidiary of HOUDAILLE-HERSHEY CORPORATION

Below is shown the progressive 80-ton Diesel-Electric Switcher, built by the H. K. Porter Company, Inc., of Pittsburgh, Pennsylvania.





The slightest movement of the throttle is hydraulically transmitted to the motor speed control.

SPERRY'S HYDRAULIC CONTROLS minimize design problems by means of a single connecting tube that can be bent around corners and obstacles or installed through bulkheads, thus reducing design, installation, and maintenance costs.

The H. K. Porter Company, Inc., of Pittsburgh, makers of the well-known Porter Diesel-Electric Switchers, now feature "fingertip control" on their locomotives. This selection adds another application of the Sperry Hydraulic Control; a single-line remote control and positioning device, used successfully by many and varied industries. This is what the H. K. Porter Company has to say about the Sperry Control:

- **"The installation assures accurate synchronization of the speed of the two diesel engines in the double power plant.**
- **It accomplishes this by eliminating the necessity for mechanical linkage from the operator station to the engine by means of flexible piping.**
- **This method has advantage over previous installations because it does away with troublesome rods, jaws, pins, cables, pulleys, and turnbuckles, and the necessity for mechanical alignment.**
- **It eliminates lost motion of the mechanical method, back lash, and need for constant adjustment. Just as the installation is easy to design and build, so is it easy to maintain. The control gives instant and accurate response to the slightest movement of the throttle."**

EASY INSTALLATION . . . DEPENDABLE . . . ACCURATE

Send for Bulletin 78 for additional details

SPERRY

For Scientific Achievement

SPERRY PRODUCTS, INC.

CHICAGO, ILL. HOBOKEN, N. J.

. . . . *Continued from page 106* . . . .
weight could be utilized in additional power with resulting increase in speed, or in greatly increased cruising radius.

The feasibility of such a system under laboratory conditions was demonstrated beyond a doubt. The principal difficulties attending this form of operation were determined and, in general, were successfully overcome. The adaptation of this principle to large craft is considered merely a sizeable problem in mechanical co-ordination, but certainly possible of accomplishment.

Cost—(25 pages)—$1.25 plus a service charge of $1.00.

Vortox Appoints Eastern Representative

ANNOUNCEMENT of appointment of N. B. Hedden, as sales representative for the eastern and central states, has just been made by the Vortox Company of Claremont, California. His headquarters will be at the Vortox office in Detroit following an extended visit at the laboratories and main offices in California.

N. B. Hedden

Prior to joining Vortox, Mr. Hedden was in charge of the Tractor Test Program of the Oliver Corporation at Phoenix, Arizona where the performance and efficiency of heavy duty air cleaners were important factors. Previously, he was associated for over fourteen years with the Ethyl Corporation, in their Chicago Division, following graduation from Purdue University.

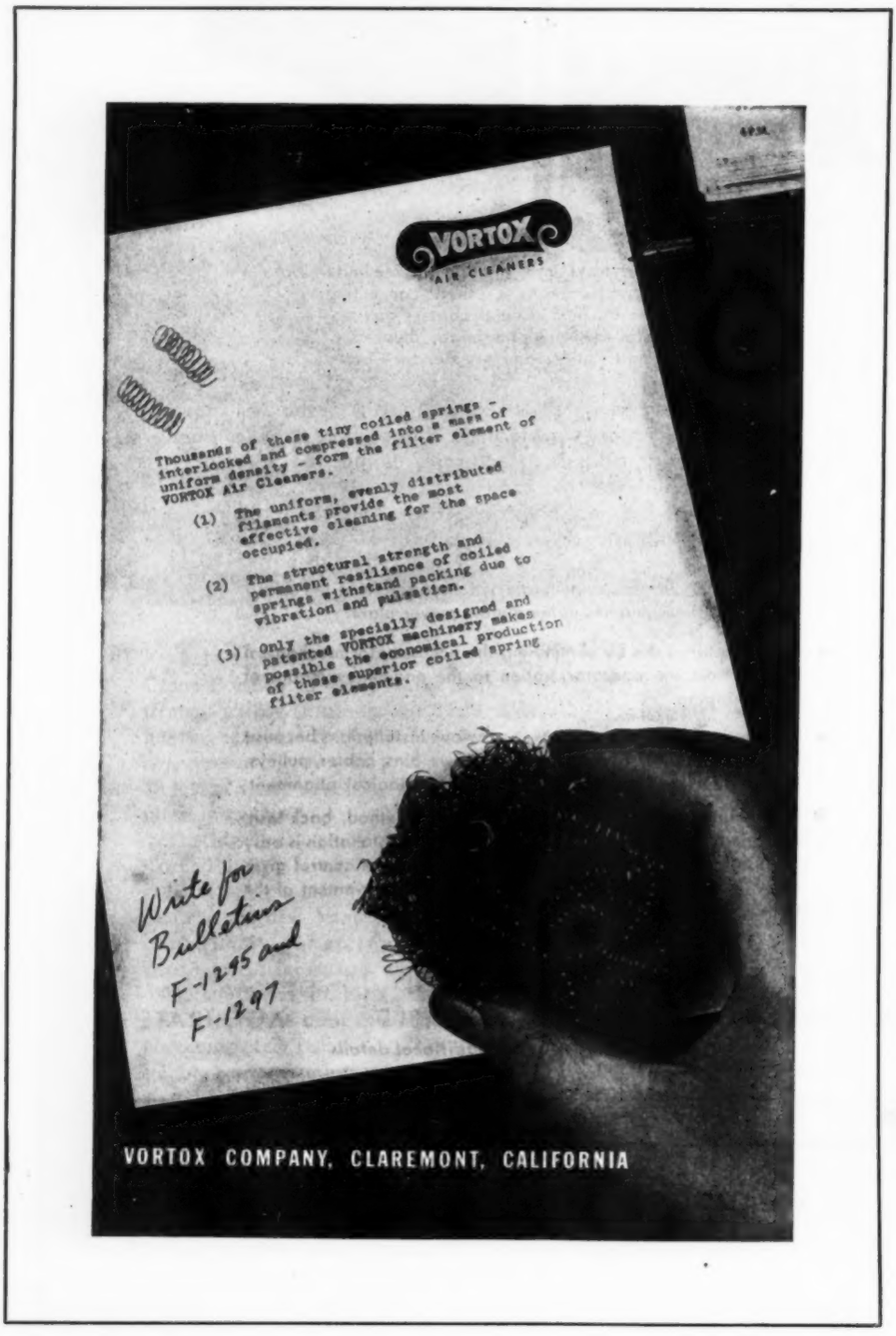
Allis-Chalmers Appoints Public Relations Manager

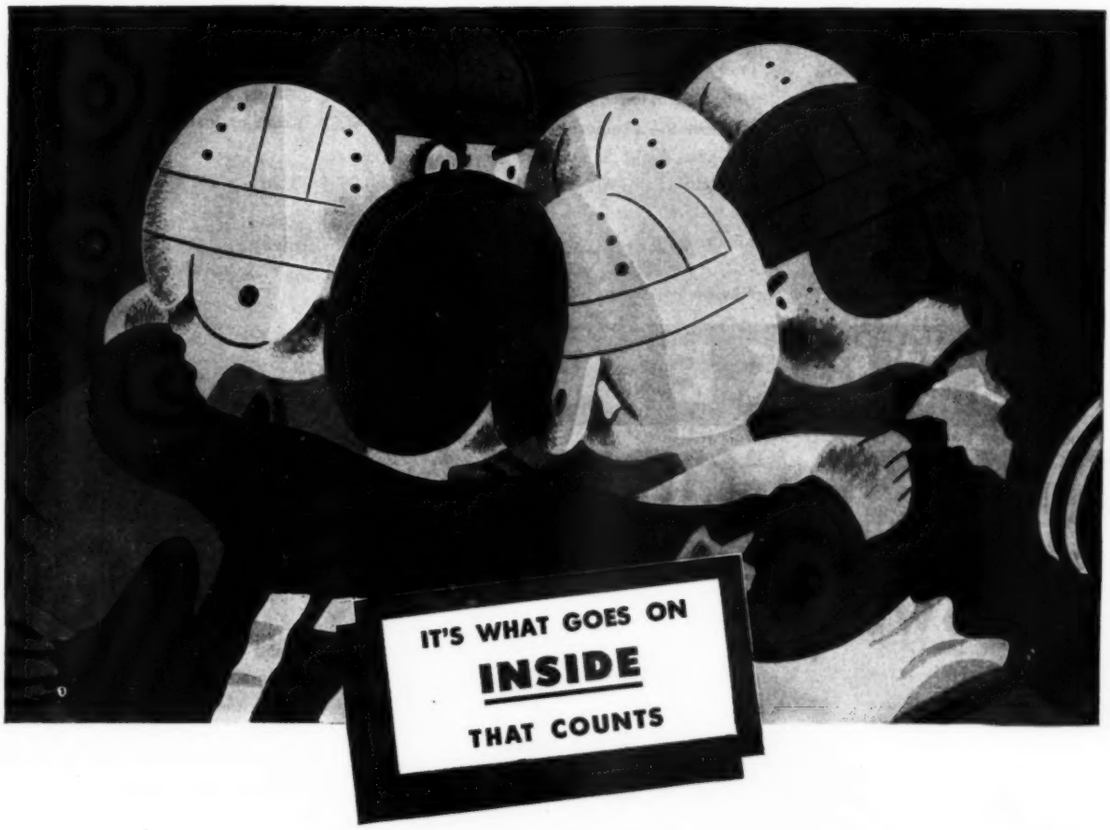
ARTHUR R. TOFTE has been named manager of the advertising and public relations department, Allis-Chalmers Manufacturing Co., by William C. Johnson, vice president of the firm's general machinery division.

Tofte has been a member of the department since 1938. He succeeds George J. Callos, who resigned to become vice president and account executive for Klau-Van Pieterson-Dunlap Associates, Inc., Milwaukee advertising agency.

The new manager entered the department as copy chief. He became director of employe publications in 1942 and held that position until he was selected to head the department.

Tofte entered the advertising field in 1925 after graduating from the University of Wisconsin. He has served in copy departments of several advertising agencies and also as advertising manager of the Sterling Motor Truck Co. He was a member of the advertising department, Bucyrus-Erie Co., immediately before going to Allis-Chalmers.


VORTOX
AIR CLEANERS
Thousands of these tiny coiled springs - interlocked and compressed into a mass of uniform density - form the filter element of VORTOX Air Cleaners.
(1) The uniform, evenly distributed filaments provide the most effective cleaning for the space occupied.
(2) The structural strength and permanent resilience of coiled springs withstand packing due to vibration and pulsation.
(3) Only the specially designed and patented VORTOX machinery makes possible the economical production of these superior coiled spring filter elements.
Write for Bulletins F-1295 and F-1297
VORTOX COMPANY, CLAREMONT, CALIFORNIA



Inside an engine, Pedrick rings mean big gains in performance

IF YOUR ENGINES are calling for time-out, put them back into action, with plenty of power, by installing Pedrick *precisioneered* Rings.

Pedrick rings give engines new power because they fit exactly, preventing blow-by and loss of compression. Pedrick's exclusive Heat-Shaping process gives the right radial pressure at all points. Under this process the correct pressure is set for life in each ring.

With new equipment on order or on the drafting boards, Diesel operators still face critical problems in keeping old engines going. Pedrick rings for worn, tapered, or out-of-round cylinders keep engines at top efficiency. Specify Pedrick rings for your next repair job.

WILKENING MANUFACTURING CO., Philadelphia 42, Pa. *In Canada:* Wilkening Manufacturing Co. (Canada) Ltd., Toronto.

Finish the Job. Buy VICTORY BONDS . . . For This Final, and Vitally Important Campaign

Pedrick
precisioneered PISTON RINGS

New Caterpillar Catalog

THE many sterling qualities of the "Caterpillar" Diesel D6 Tractor are thoroughly described in a 32-page color catalog just released by Caterpillar Tractor Co., Peoria 8, Illinois. The catalog freely illustrates the features of this tractor and the Diesel engine that motivates it. Specifications and the complete line of matched equipment for the D6 are listed. For a free copy of this catalog, please request Form 9106.

U. S. Gauge Co. Announces Appointments

AS part of the plan to enlarge the sales organization of the United States Gauge Company, I. Newton Becker, Vice-President in charge of Sales, Engineering and Research, announces the promotion of W. S. O'Connor to National Field Sales Manager to assist L. L. Corcoran, Sales Manager. H. M. Bear will succeed Mr. O'Connor as District Manager of sales territory covered by the New York office.

Marlo Coil Appoints Walter Moses Jr.

MARLO Coil Company has announced the appointment of Walter B. Moses, Jr. as regional representative in Louisiana, Mississippi, Alabama and Northwestern Florida, effective September first.

Walter B. Moses, Jr.

Mr. Moses, a graduate engineer, is well known in the refrigeration and air conditioning field and a member of ASHVE. He is resuming his commercial and engineering activities after wartime service as Assistant Naval Architect of Pendleton Shipyards Co., Inc. at New Orleans. His headquarters will be at 7836 St. Charles Street, New Orleans.

Victory Conference Results Available

HIGHLIGHTING each of the 1945 Victory Conferences of the Oakite organization, held in New York and Chicago during October, was a vast exchange of technical information on cleaning, descaling, derusting, degreasing and related operations, particularly as applied to peacetime manufacture of civilian products. In addition to the entire field forces of more than 140 Oakite Technical Service Representatives, these conferences were attended by the staffs of the Mechanical Engineering, Chemical and Research Laboratories of Oakite Products, Inc.

The various discussions revealed many low-cost, time-saving techniques for handling such maintenance tasks as descaling Diesel cooling systems; cleaning lube oil and jacket water coolers; degreasing parts before repair and overhaul; cleaning intercoolers or air compressors; cleaning air compressor valves; and many other important cleaning and related operations.

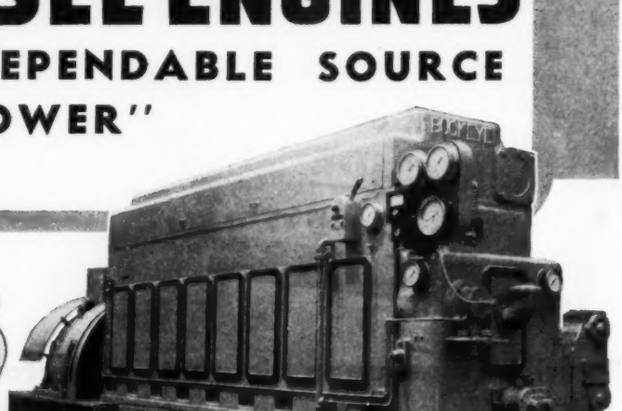
Of particular interest was the announcement of the newly-developed Oakite-Vapor Cleaning Unit, which will soon be available to industry.

. . . . *And now please turn to page 114* . . . .

BUCKEYE

DIESEL ENGINES

"A DEPENDABLE SOURCE OF POWER"



Marine or Stationary

FOR NEW INSTALLATIONS
REPLACEMENTS OR CONVERSIONS

In thousands of marine and stationary installations, Buckeye Diesels are doing mighty good jobs—the kind of jobs their owners take pride in telling you about—the kind of job you want YOUR next Diesel engine to do for YOU.

The Buckeye catalog explains, in easily understandable detail, how a Buckeye Diesel combines precision construction with economical power and dependable operation. Your copy will be sent on request.

Stationary and Marine Propulsion (Direct Reversing) Engines 150 - 900 H.P.	Marine Auxiliary and Stationary Generator Sets 100 - 600 KW

Supercharged Ratings to 1440 H.P. and 1000 KW.

THE BUCKEYE MACHINE CO. — LIMA, OHIO

• ENGINE BUILDERS SINCE 1908 •

★ TUGS
★ TRAWLERS
★ TANKERS
★ BARGES

Complete facilities for construction, repairs and rebuilding engines, including one of the best equipped machine shops in the industry. Welding a specialty. All departments maintained and staffed to handle capacity volume on schedule. Phone TRemont 2-6100.

WOOD OR STEEL CRAFT.
•
ALTERATIONS,
•
CONSTRUCTIONS
•
AND REPAIRS

CONSOLIDATED
SHIPBUILDING CORPORATION
MORRIS HEIGHTS, NEW YORK

. . . . *Continued from page 110* . . . .
Capable of generating steam pressure up to 200 lbs. within 1 to 2 minutes after starting from cold, this unit discharges 60 to 90 gallons of steam cleaning solution per hour at the desired steam pressure up to 200 lbs. Further, continuous operation of two steam guns at the same time is possible with this unit. It is practical for use in a wide variety of industries such as railroads, shipyards and repair basins; garages and service stations; large plants or factories; paper and textile mills; dairies, bakeries, breweries or wherever there is a need for heavy duty steam cleaning.

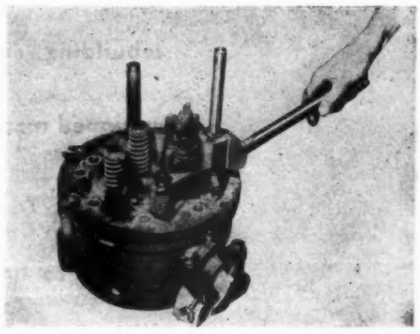
The information exchanged at the Oakite Victory Conferences is freely available to those interested, through the medium of the Oakite Technical Field Service Staff.

New Plastic Coating Booklet

HERESITE & Chemical Company has just published a booklet describing the extensive uses of Heresite Plastic Coatings, Synthetic Resins and Molding Compounds. The applications of these materials range across almost every phase of industry including many specific uses in Diesel engines and accessories such as protective coating of water-cooled silencers, heat exchangers, exhaust manifolds, pumps and cooling systems. This 41-page, profusely illustrated booklet will be mailed without charge to those requesting it on their business letterhead. Address Heresite & Chemical Company, Manitowoc, Wisconsin.

One-Man Valve Spring Depressor

A NEW valve spring depressor designed for one man operation in dismantling and assembling Diesel engine valves is now manufactured by the Paxton Diesel Engineering Company. It is called the SAFE-N-EZY Valve Spring Depressor and is safe, easy to apply. The new tool will compress a valve spring to any point and hold it there. This leaves the mechanic's hands free to remove the keepers and pin and then proceed with the job. It does not nick the stud and is so designed that the spring can be released safely and simply.



Application of Safe-N-Ezy spring depressor to E.M.C. 567 Diesel.

SAFE-N-EZY valve spring depressors are available in sizes and models to fit all modern Diesel engines. The tool is ruggedly constructed, lightweight, and easy to store. For full particulars write the Paxton Diesel Engineering Company, Omaha, Nebraska.

Get to know this button.

FREE YOUR ENGINE of gum and sludge

THE FIRST service operation necessary to smooth running and long lasting motors is desludging. Thanks to **LOOSITE** and **SILOO,** every type of internal combustion engine can be freed of gum and sludge quickly, easily, safely. **LOOSITE** cleans out the engine, then **SILOO** added to fresh crankcase oil keeps it clean. Here is real economy.

When every minute of service and every extra day of engine life means increased out-put, **LOOSITE** and **SILOO** are essentials. Make the test today. Once desludged you will be amazed at the smooth running power that is hidden in those engines. They will last longer and perform better.

If you heat with oil, ask about SILOO FUEL OIL TANK SOLVENT • LOOSITE and SILOO can be used safely and effectively in *any* type oil filter.

PETROLEUM SOLVENTS CORPORATION

Solvents for all types of Petroleum Residues

General Offices: 331 Madison Ave., New York 17, N. Y.

Parts with guts for the job

McQUAY-NORRIS
ALTINIZED
PISTON RINGS

In trucks, tractors, locomotives, ships . . . wherever there is work for Diesels, McQuay-Norris parts are giving efficient, dependable, economical performance. With 34 years' experience in precision manufacture, McQuay-Norris includes the Diesel field in its achievements in metallurgical development, heat treating, clinical research and engineering design. Send us your blueprints.

ARMY E NAVY
Awarded to two plants McQuay-Norris Ord. Management Division

McQUAY-NORRIS
MANUFACTURING COMPANY

ST. LOUIS, MO.

PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM

Denver and Rio Grande Buys More Diesels

THE trustees of the Denver and Rio Grande Western Railroad recently received authorization from the Federal Court to purchase three new 5,400-hp. Diesel-electric, four-unit freight locomotives from the Electro-Motive Division of General Motors Corp. at an approximate cost of $1,590,000. Delivery of the Diesels is expected in January or February and will give the railroad a total of 15 such locomotives. The new units will be equipped with heating boilers for potential use in passenger service.

Elliott Announces Executive Appointments

GRANT B. SHIPLEY, chairman of the Board of Elliott Company, announces that at a meeting of the Board of Directors, W. A. Elliott was elected president. Mr. Elliott has been executive vice president. Mr. Shipley, who remains as chairman of the Board, previously was also president. F. H. Stohr, formerly assista to the president, was elected executive vi president and F. W. Dohring, who has bee general sales manager, was elected vice pre dent in charge of sales. Other executive office of Elliott Company include: R. W. Owen vice president in charge of manufacturing, B. B. Smith, vice president in charge of enginee ing, Dundas Peacock, controller, and M. G Shevchik, secretary and treasurer.

JUST OFF THE PRESS

THE 1945 Edition of the DIESEL ENGIN CATALOG, Volume 10, is ready for distribu tion. It is the largest edition yet published 532 pages, hundreds of illustrations—a *Com posite Catalog* of the *Entire Diesel Industry* Page size 10⅛ in. x 13½ in.—a big book and a real value. A separate section devoted to each manufacturer's line of engines with completely illustrated descriptions and specifications—cov ering stationary, marine, automotive and rail way types. Other sections cover Diesel acces sories such as fuel injection equipment, chain and gear drives, electric, hydraulic and me chanical couplings, superchargers and many other items. Also contains a directory of prod ucts and manufacturers. An indispensable book for all interested in Diesels. Paper restrictions limit the supply so order your copy promptly— a convenient coupon will be found on page 112 of this issue.

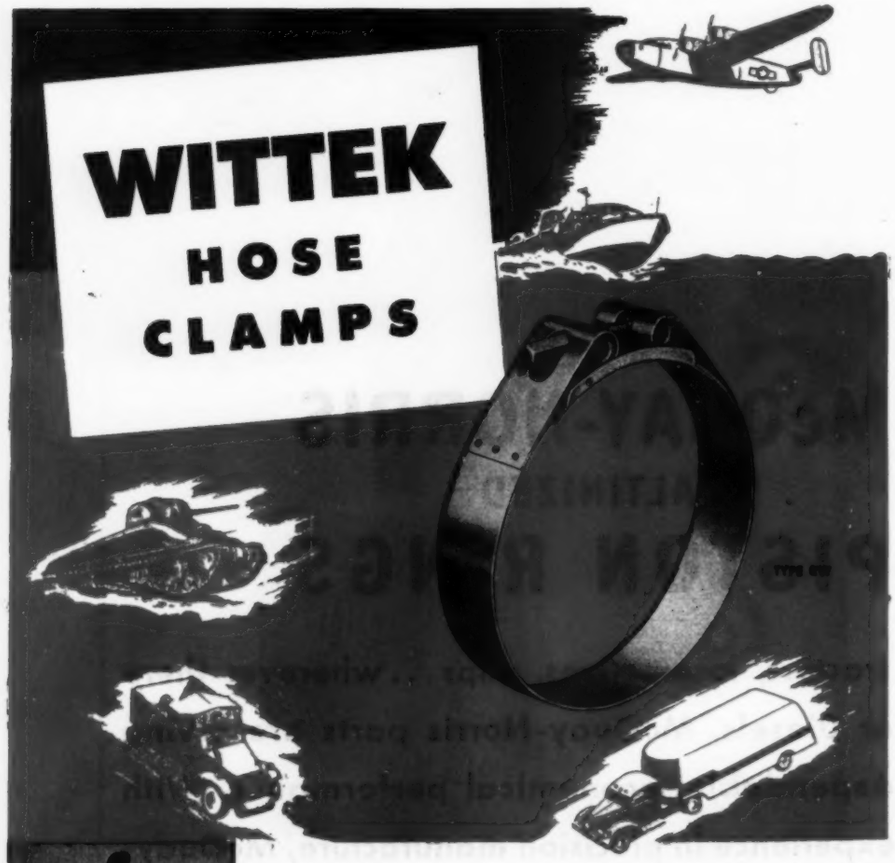
American Locomotive Elects New Officers

ELECTION of Robert B. McColl as executive vice-president of American Locomotive Com pany was recently announced by Duncan W. Fraser, president. Mr. McColl is succeeded as vice-president in charge of manufacturing by W. L. Lentz of Schenectady, who directed the company's vast tank and locomotive manufac turing program there the past five years.

Robert B. McColl and W. L. Lentz

Mr. McColl has the distinction of being one of the few American members of the Institute of

. . . . *And now please turn to page 118* . . .



FOR DIESEL APPLICATIONS

Strong—Dependable—Easily Installed

The dependability of Wittek Hose Clamps, long accepted by the automotive and aviation industries, is now being proven by actual service with the armed forces of the United Nations as standard equipment for aircraft, tanks, jeeps, trucks, ships and other combat vehicles. Wittek Hose Clamps are made in many different sizes and types for Diesel applications: Type RW for hose connections of 5" in diameter and larger; Type RM for 3½" to 5"; Type RN for 2½" to 3½" and Type FBC for 2½" hose connections and smaller. Write for new descriptive catalog. Wittek Manufacturing Co., 4305-15 West 24th Place, Chicago 23, Illinois.

WITTEK *Hose Clamps*
Dependable Hose Connections

THE *Modern* METHOD OF JOINING COPPER AND BRASS PIPE

WHERE EXPANSION AND VIBRATION PREVAIL

SAFEGUARD YOUR PIPE LINES WITH *Silbraz Joints**

VALVES FLANGES FITTINGS

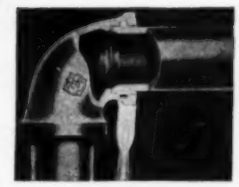
For any services where extremes of temperature or vibration are encountered, you can prevent piping trouble by specifying Silbraz joints on all copper and brass pipe or tubing. These threadless, modern joints – made with Walseal bronze valves, fittings, and flanges – won't creep or pull apart under any temperature, shock, or pressure which the pipe itself can withstand. Silbraz joints remain tight and leak-proof under punishment far greater than that encountered in normal industrial services.

Proof of the unusual stamina of Silbraz joints is found in their outstanding performance on fighting ships, tanks, and other war equipment.

Easily made up by oxyacetylene flame brazing, Silbraz joints require neither maintenance nor repairs. They make every pipe line in which they are used a leak-proof, truly "one-piece" line. Be sure to send for a free copy of Catalog 42 for a full description of Walseal valves, fittings and flanges for making Silbraz joints.

*Registered trade marks

After cleaning and fluxing pipe and fitting, insert pipe into fitting up to shoulder. Then expand pipe by heating with the oxyacetylene flame.



Heat a section of the fitting, directing flame toward pipe or tubing. This causes section of fitting to expand, allowing alloy to flow.

Heat both pipe and fitting with a wiping motion of torch. Remove flame. Fitting contracts, alloy flows and forms ring at fitting edge, completing Silbraz joint.

MAKE IT A "ONE-PIECE PIPE LINE" WITH WALSEAL

12 AWARDS TO 4 PLANTS

WALWORTH

valves AND fittings

60 EAST 42nd ST., NEW YORK 17, N.Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

. . . . *Continued from page 116* . . . .

Mechanical Engineers, London, and has been engaged in locomotive manufacture since boyhood when he started as an apprentice with the Glasgow and Southwestern Railroad in Scotland.

He has been successively manager of this plant, president of the company's Diesel engine manufacturing division, known as the old McIntosh and Seymour Corporation, president of the Alco Products Division of the company, and vice-president in charge of manufacturing for the locomotive company.

Mr. Lentz, formerly with the New York Central System, took over the management of the Schenectady plant at the outset of the war and supervised the conversion of the plant from its exclusive locomotive building operations to what was at one time the country's second largest tank producing arsenal.

An aviation cadet and artillery officer in the last war, Mr. Lentz began railroading in 1913 with the New York Central. For an interval after 1937 he was sales manager of the Standard Stoker Company.

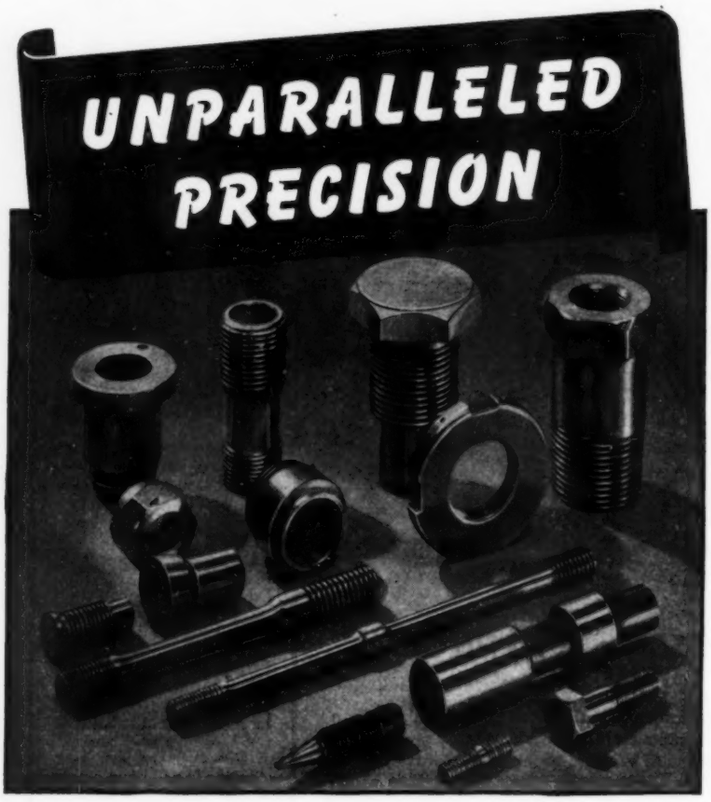
Crocker-Wheeler Brings Out New Vertical Motor

THE Crocker-Wheeler Division of Joshua Hendy Iron Works announces a new addition to the company's line of Protected-Type a-c motors. The newcomer, a vertical dripproof motor which is rated at 40 C rise continuous duty with a 15% service factor, is designed for operation from 60 or 50 cycle, 3 or 2 phase circuits at all standard voltages. At present a NEMA "B" flange type mounting up to and including the "284" frame, and a NEMA "C" face type mounting up to and including the "326" frame is available.

Crocker-Wheeler Protected-type vertical motor.

All ventilating openings of this new line of motors are shielded against the entrance of dripping liquids and falling particles. Oversize ball bearings are provided to carry thrust in addition to the rotor, and the use of the company's patented centrifugal bearing seal permits the use of softer grease for better lubrication and longer bearing life.

A new recessed junction box, which provides ample room for making electrical connections, is employed in the motor's design. The Crocker-Wheeler Alucast rotor, with bars, fans and end rings cast in one operation from aluminum alloys, is used. Other features include: heavy cast frame construction and coils protected with Vinylastic insulation.

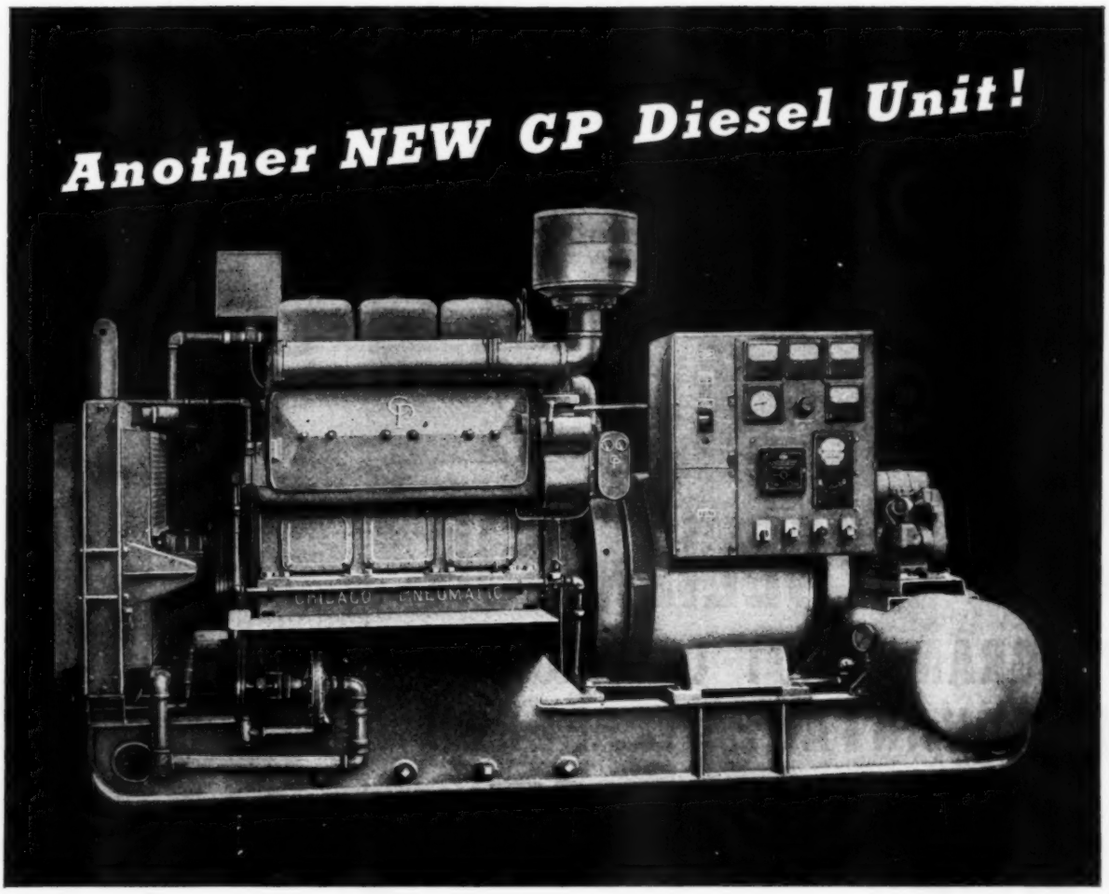


For years The Chicago Screw Company has been manufacturing Screw Machine Products with unparalleled precision.

In the "Chicago Screw" plant are hundreds of machines. Some are standard, some are specially built; all are designed to do the best job on your particular requirements. There are ample up-to-the-minute facilities for Milling, Drilling, Boring, Broaching, Thread Rolling and Grinding, Hydrogen Brazing, Electronic Heating, etc. . . facilities to produce not just small parts—not just large parts—but any special screw machine part in any size from ⅛" to 5" diameter in any type of raw material.

You will find it worthwhile to get in touch with "Chicago Screw's" matchless facilities for making precision-made Screw Machine Products.

THE CHICAGO SCREW CO.
1026 So. Homan Avenue Chicago 24, Ill.



CP Diesel Electric Power Unit

CP presents the newest in its line of self-contained, readily portable Diesel Electric Generating Units, furnished completely equipped — capable of immediate use with the absolute minimum in installation cost.

This cleancut unit, representing the latest in advanced engineering, was designed to make power quickly available in remote locations. Ideal for mining, petroleum, utility, manufacturing, quarrying and many other fields, this heavy duty set is supplied complete with all accessories — intake filter, exhaust silencer, starting air equipment, switchboard, voltage regulator, water cooling equipment, oil storage and all required piping and wiring. Developing 100 kw., this CP unit is easily arranged for parallel operation with two or more units in multiple installation. Also available are similar portable CP Diesel Units in 175 and 250 kw. sizes. Write today for complete information.

PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Briggs Clarifier Sets Up Public Relations Department

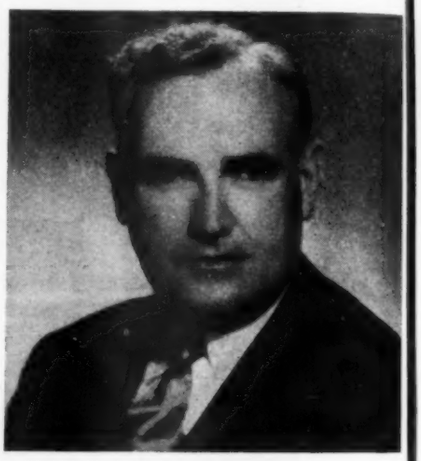
THE Briggs Clarifier Company has initiated an aggressive advertising and public relations campaign in harmony with its postwar sales plans. These activities are now centered in a new department reporting directly to President Chase Donaldson. Cecil Hopkins has been appointed advertising director; Rommie F. Simmons, Jr., assistant advertising director.

Cecil Hopkins, who has been in charge of the company's industrial relations for the past four years, was graduated from the Harvard Graduate School of Business Administration in 1930. He was formerly assistant secretary of the New York Credit Men's Association, where he edited its official magazine, "Credit Executive" and handled its public relations. For a short time Mr. Hopkins was assistant to Bernard Lichtenberg, late president of the Institute of Public Relations.

Rommie F. Simmons, Jr. joined Briggs in its early days when its product consisted entirely of automotive type filters. As a former plant manager and service engineer of the company Mr. Simmons acquired full knowledge of its products. From this engineering background, Mr. Simmons was promoted to advertising manager and developed the company's first comprehensive advertising and sales promotion program.

Chicago Pneumatic Promotes Branch Manager

THE appointment of Guy J. Coffey as Vice-President in Charge of Sales of the Chicago Pneumatic Tool Company was recently announced by W. Luther Lewis, Executive Vice-President.



Guy J. Coffey

"The promotion of Mr. Coffey from Manager of the Los Angeles District Office, a post he has held since 1939, to an officer of the company, is in line with the organization's plans for expanded activities in the post-war selling field," according to a statement made by Mr. Lewis. Mr. Coffey was selected for this position as a result of his successful record of selling and sales management during his 12 years with the Chicago Pneumatic Tool Co. He joined the company in 1933 as a salesman in the Philadelphia branch, next being advanced to the Cleveland office, and finally to Manager of the West Coast office.

DIESEL PROGRESS Editorial Index

A COMPLETE index of all editorial material which appeared in the 1944 issue of DIESEL PROGRESS is now available. Included is a cross index of authors and articles. Feature articles are covered by title; news notes are indexed by names of manufacturers. No charge for this index. Address requests to DIESEL PROGRESS, 2 West 45th Street, New York, 19.

FOR YOUR DIESELIZATION
PROGRAM DON'T OVERLOOK
THE ADVANTAGES OFFERED
BY THE...
HELIXHAUST
WATER-COOLED MANIFOLD
● TURBO-CHARGING modernizes 4-cycle Diesels. The HELIXHAUST is new. It reduces temperature of exhaust gases—makes engine room livable. It increases permissible supercharged rating of Diesel engines. It's simple, yet highly efficient, neater and more attractive. Get all the facts. Write Stewart for more details about the HELIXHAUST Water-Cooled Manifold as well as Intake Manifolds, Water Inlet Headers and Water Discharge Pipes.
Outside view of the HELIXHAUST
Inside the HELIXHAUST
FABRICATED BY STEWART
Stewart
FABRICATORS OF
IRON · STEEL · WIRE
THE STEWART
IRON WORKS CO., INC.
1281 Stewart Block
Cincinnati, Ohio

QUESTION:

Can engines using additive oils be served by a YM unit?

ANSWER:

IT'S A DEMONSTRATED FACT THAT THEY CAN!

QUESTION: *Aren't the Additives Removed in the YM Unit?*

ANSWER: *Many of them are.* But *treatment in a YM Oil Refiner gives the oil remarkable anti-varnish and anti-ring-sticking properties, even though* no *additives remain.*

QUESTION: *Will You Guarantee YM Performance?*

ANSWER: *In specific cases, guarantees are that under YM treatment, oil will remove piston varnish and prevent recurrence. Such guarantees* do not *involve engine adjustments—nor a change to another brand of lube oil.*

QUESTION: *What About Sludge Deposits?*

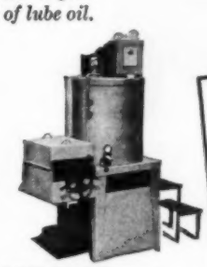
ANSWER: *Oil kept clean in a YM unit can remove existing sludge deposits, and thereafter prevent their formation.*

QUESTION: *Is the YM Process Adaptable to Continuous Operation?*

ANSWER: *The YM process offers you a choice between continuous and automatic operation, or batch treatment —whichever is better suited to your requirements.*

QUESTION: *How Can I Find Out What YM Will Do for Me?*

ANSWER: *Just mail the coupon below for preliminary information, and names of users near you. Or send us details of your engines and power supply for specific recommendations.*



The Youngstown Miller Company
1112 Kidde Avenue, Belleville 9, N. J.

Gentlemen:
Please send me further details about the YM Oil Refiner—and names of users in this locality.

Name_____

Position_____

Company_____

Street Address_____

City and State_____

THE YOUNGSTOWN MILLER COMPANY
A Subsidiary of Walter Kidde & Company, Inc.
1112 Kidde Avenue, Belleville 9, New Jersey

Carl Flesher Joins Joshua Hendy

APPOINTMENT of Carl Flesher to the executive staff of the Joshua Hendy Iron Works, effective September 1, is announced by Charles E. Moore, president of the company. Flesher will serve as an assistant to the president, dealing with special engineering and sales projects for Hendy.

Carl Flesher

Flesher is former west coast regional director of the United States Maritime Commission and has an extensive background in engineering. Since the beginning of the war he has been in close with the Hendy plant because of the large production of Maritime work in progress there between 1941 and 1945.

Harry G. Howell Back To Tube Turns

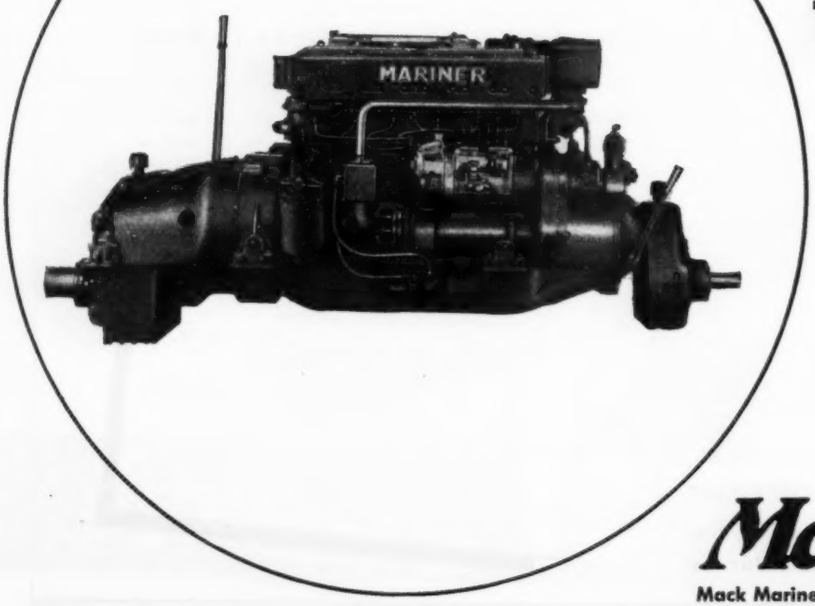
Harry G. Howell

HARRY G. HOWELL, one of the nation's foremost forging specialists and an authority on factory management is the new vice president of Tube Turns, Inc., Louisville, Ky., in charge of production. A native Kentuckian, he returns to the Bluegrass after four years as head of Oldsmobile's plant and a total of twenty-two years' association with General Motors. Born in Kilgore, Ky., he attended Purdue and began his career with GM's Buick Division.

JUST OFF THE PRESS

THE 1945 Edition of the DIESEL ENGINE CATALOG, Volume 10, is ready for distribution. It is the largest edition yet published—532 pages, hundreds of illustrations—a *Composite Catalog* of the *Entire Diesel Industry*. Page size 10⅛ in. x 13½ in.—a big book and a real value. A separate section devoted to each manufacturer's line of engines with completely illustrated descriptions and specifications—covering stationary, marine, automotive and railway types. Other sections cover Diesel accessories such as fuel injection equipment, chain and gear drives, electric, hydraulic and mechanical couplings, superchargers and many other items. Also contains a directory of products and manufacturers. An indispensable book for all interested in Diesels. Paper restrictions limit the supply so order your copy promptly—a convenient coupon will be found on page 112 of this issue.

MODERN MARINERS MAKE THEIRS MACK



Men who use boats for business know the importance of motor economy. Profits go up as operating costs go down . . . and Mack Mariners pay their way on many a busy boat through money-saving operating efficiency.

Mack has been building engines for 41 years . . . knows how to build-in maximum power, durability and economy. Mack Mariners are quick starting—4 cycle efficiency, from 60 to 100 h.p.—conservatively rated on a continuous duty basis.

CONVENIENT! Mack has direct factory branch service at 28 tidewater and 14 freshwater ports.

MACK MANUFACTURING CORPORATION
Marine Engine Department
Empire State Building, New York 1, N. Y.

Mack DIESEL MARINE POWER

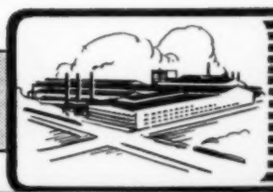
Mack Marine Engines are a product of the builders of world-famed gasoline and diesel-powered trucks, buses and fire apparatus

BUY VICTORY BONDS

FORGINGS *for* AMERICA'S DIESELS

It was our pleasure to have supplied the crankshafts, connecting rods and various large forgings for the Nordberg 6000 hp. main propulsion Diesel, also for the two Nordberg 1250 hp. auxiliary Diesel engines which power the U. S. Maritime Commission cargo ship "Emory Victory".

ERIE FORGE COMPANY, ERIE, PA.

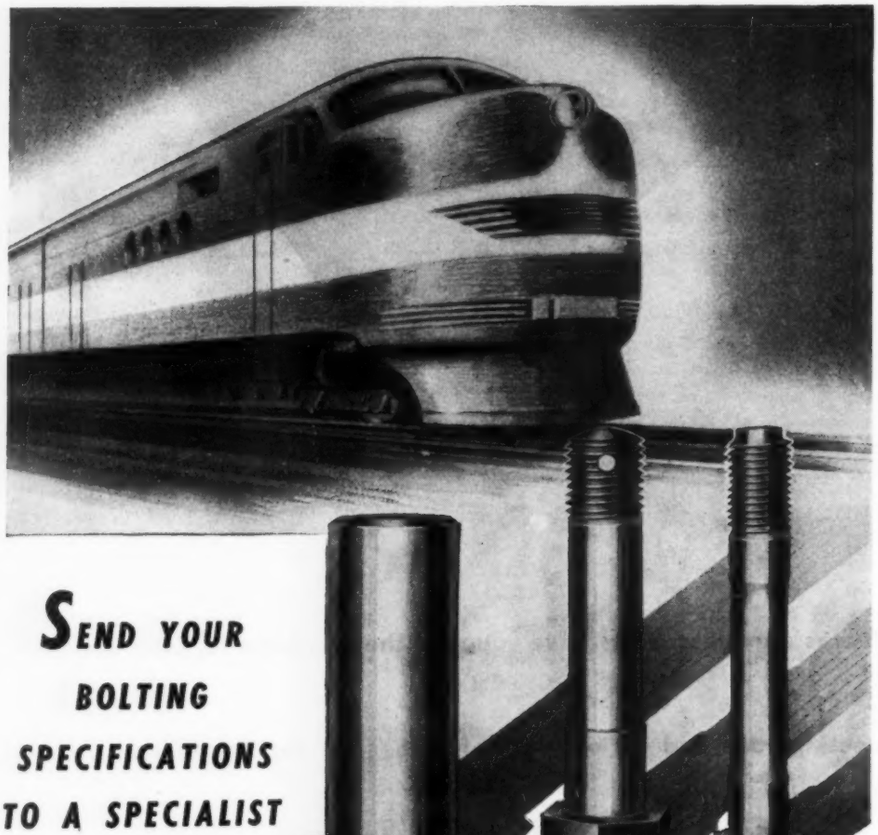


Perfect Circle Announces Changes In Sales Personnel

SEVERAL changes in the sales personnel of the Replacement Division of The Perfect Circle Company have just been announced by J. C. Hamilton, Sales Manager of the Replacement Division.

J. W. (Bill) Kern has taken over the Regional Managership of the area which embraces California, Arizona and Western Nevada. Mr. Kern replaces Jack Taylor who has been transferred to the factory to assume the sales management of a new Perfect Circle product shortly to be announced.

Mr. Kern who had the rank of Commander has been honorably discharged from the Navy where he served for almost five years in various Navy assignments. William E. Hays has taken over a Southwest district which is supervised by Perfect Circle's Regional Manager, George Vierling of Dallas, Texas. Mr. Hays will make his headquarters in Tulsa, Oklahoma.



SEND YOUR BOLTING SPECIFICATIONS TO A SPECIALIST

AS A SPECIALIST in the manufacture of distinctive bolting, ERIE has manufactured thousands of various bolts, studs and pins. Typical of these are the three pieces shown, which are used in the building of Diesel locomotives.

In view of the special material, heat treatment and close tolerances desired, only a special can meet the rigid requirements of the designer's specifications.

When high quality fasteners are required, together with assurance of lasting economy and top performance, it will pay you to call on ERIE. Your inquiries will receive our best attention.

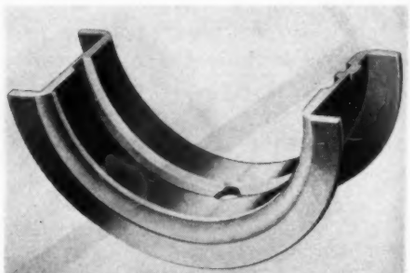
ERIE BOLT & NUT CO.
ERIE, PA.
STUDS • BOLTS • NUTS ~ ~ ALLOYS • STAINLESS • CARBON • BRONZE

Durex Steel Back Bearings

A PEACE-TIME product developed just previous to the war and catapulted into the war picture because of its remarkable durability, Durex-100 Engine Bearings will be produced in quantities for motor cars and trucks by the Moraine Products Division of General Motors.

Durex-100 Bearings, produced especially for the main and connecting rods of internal combustion engines enable automotive engineers to design engines operating at high unit bearing pressures.

Because of the high speeds of operation and the terrific pounding that tanks, military trucks, and marine engines take in war operations, the bearings came to the attention of the Army and Navy Ordnance because of their durability. During the war they were used on trucks, tanks, ducks, crash fire pumpers, track-laying prime movers and auxiliary power plants on the B-29 Superfortress. They were used on both gasoline and Diesel engines.



Precision-type Durex-100 steel back bearing.

Power metallurgy technique formed the basis for producing the Durex-100 bearing. It is essentially a steel-backed lead base babbitt lined bearing. There is, however, an additional intermediate layer of a metallic sponge-like structure, or matrix, copper brazed to the steel back into which the babbitt is cast. This babbitt, which was specifically developed for this bearing, is a corrosion resistant high-lead alloy.

Santo Tomas Survivor Heads Aireon Advertising

CLAY CRANE, newly appointed director of Public Relations and Advertising for Aireon Manufacturing Corporation, is a civilian veteran of World War II. And he holds one of the few war department awards to prove it. His Asiatic-Pacific and Philippines campaign ribbons denote 37 months in the Santo Tomas prison camp near Manila and the official award reads "for fortitude and courage which contributed materially to the success of the Philippine campaign."

Clay Crane

The announcement of Crane's appointment at Aireon was made by R. C. Walker, president of the corporation, manufacturers of electronics, radar, hydraulics, and railway radio equipment. For two years prior to the outbreak of hostilities in the Pacific, Crane lived in Manila, a staff member of the National City Bank of New York. January 3, 1942 he, with many other civilians still in Manila, was herded into Santo Tomas where they remained until liberated by advancing American units in February of this year.

New Test Laboratory For Elliott

CONSTRUCTION of a new test laboratory to cost $750,000 and greatly extending the facilities of the research engineering division of the Elliott Company, Jeannette, Pa., is announced by Grant B. Shipley, president.

Plans for extensive research and development on gas turbine power plants have called for the construction of a new main building, 60 x 140 feet, and several small buildings separate and adjacent to it. Construction has already been started and is expected to be completed within six months. Located adjacent to the main Elliott factory at Jeannette, Pa., the new laboratory will be of windowless construction with uniform fluorescent lighting in addition to localized flood lights.

Among the permanent installations will be test stands for gas turbines, compressors and blowers, heat transfer equipment, a combustion laboratory, a metallurgical laboratory, and an experimental machine shop. The gas turbine test stand will be used for testing many sizes of gas turbines. The power source for the gas turbine test stand will be a combustion chamber capable of providing 12,500 cubic feet per minute of compressed air at any pressure up to 35-lb. gage and any temperature up to 1500° F. The test stand will be equipped with a permanent foundation for mounting turbines, and a special, electronically controlled, eddy current, dynamic power absorption brake which will be good for capacities up to 5000 hp. and 5000 rpm., and capable of measuring the output power with great accuracy.

Kelite Appoints Hunter Nicholson

THE appointment of Hunter Nicholson as Los Angeles Factory Manager of Kelite Products, Inc., was announced recently by L. C. Sorensen, President and General Manager. In his association with Kelite, Mr. Nicholson is to concern himself largely with factory methods and controls, placing special emphasis on improved production techniques and even greater standardization of Kelite materials.

He comes well qualified for this position, having had chemical production experience with such companies as the American Potash and Chemical Co., the Dicalite Co., A. R. Mass Chemical Co. and the Firestone Tire and Rubber Co. Mr. Nicholson is a chemical engineer.

FULL AUTOMATIC *Diesel Driven*

AUXILIARY GENERATOR SETS

Developed for and delivered to the U. S. Maritime Commission, this compact Diesel Driven Auxiliary Generator Set is installed in A-1 Tankers.

Rated 75 kilowatts with an over-all weight of only 5,000 pounds this Stewart and Stevenson product offers one of the most efficient and compact auxiliary units for marine service. It is fully automatic — it starts instantly on failure of main-line voltage, and stops the second regular service is restored.

C. Jim Stewart & Stevenson Engine Division can make prompt delivery and installation of above generator set, or other units for marine service can be supplied in various sizes; 5 to 150 kilowatts, AC or DC, and combined with air compressors and pumps if needed.

Distributors for GM Diesel Engines and Red Seal Continental Gas, Gasoline or Butane Engines.

ANYWHERE SERVICE ANYTIME

C. Jim Stewart & Stevenson

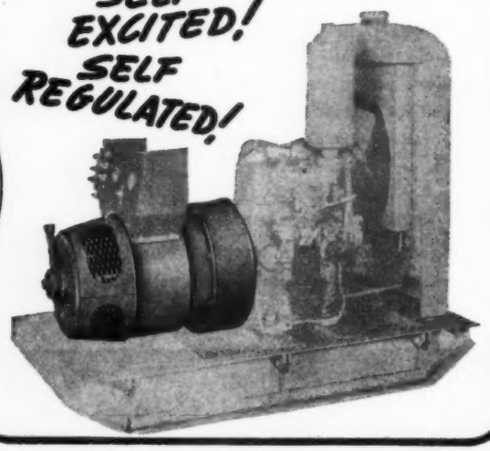
ENGINE DIVISION — 4516 HARRISBURG BLVD. — HOUSTON 3, TEXAS

TELEPHONE OR WRITE TODAY

KURZ AND ROOT

AC GENERATOR SINGLE BEARING FLANGE MOUNTED

SELF EXCITED! SELF REGULATED!



If you do not have the complete Kurz and Root catalog, send for a copy of it now.

Illustrated is the Kurz and Root self-excited, self-regulated AC generator for flange mounting, and a typical assembly showing the overall compactness attained by utilizing this flange mounted generator, that is mounted directly to the engine by means of an adaptor to fit the engine fly wheel housing. This single bearing flange mounted generator is in addition to our standard 2 bearing generator, and can be furnished with several types of adaptors to fit standard SAE bell housings . . . built in ratings from 1.25 to 18.75 KVA, both 50 or 60 cycles. Complete information upon request.

AC-DC GENERATORS

KURZ and ROOT Company Since 1898

APPLETON - WISCONSIN

. . . . . and 2 E motors and motor generator sets

HALL WET TYPE DIESEL VALVE REFACER

Model 80-A

QUICK-ACTING CHUCK LOCK for quick, easy insertion or removal of valve.
FULL BALL BEARING SPINDLE insures smoother operation.
Special type COLLET holds valve stem securely without brinelling or marking stem.
GRINDING WHEEL MOTOR
WET GRINDING prevents surface burning and stem growth; produces finer finish.
Handles valves to 5" head dia.
MICROMETER WORKHEAD FEED CONTROL Operator knows exact amount of metal being removed.
WORKHEAD MOTOR
MASTER MOTOR SWITCH and CUTOUT SWITCH
DOVETAIL TYPE WAYS accurately machined. Spring-loaded bronze gibs compensate for wear.
Write the factory or consult your HALL Jobber for complete information on the 80-A Refacer.
RHEOSTAT CONTROL adapts Workhead speed to valve dia.
TRANSVERSE or CROSS-FEED LEVER.

DUPLICATES ORIGINAL FACTORY PRECISION AND FINISH

THE HALL MANUFACTURING COMPANY • TOLEDO 7, OHIO

Care of Pistons—

. . . . *Continued from page 90* . . . .

and the piston is as clean as a new one. This procedure is also used in the ring grooves.

"After the piston has been thoroughly cleaned we inspect it for high spots, which can be noted by their brightness. We then file these down with a very fine mill file, because we feel that by relieving these high spots we take less chances of the high spots rubbing the liner wall too hard and causing seizure.

"The piston rings are also cleaned with 2 0 emery cloth, soaked in fuel oil. We follow the same procedure on the cylinder walls, cleaning them until they look like new. We then check the port bridges very closely for clearance. If any bridge has grown, we either grind or scrape them until we have about .003 in. clearance.

"I have followed this procedure for over twelve years and we have never had a stuck piston, not even a scratch on piston or cylinder walls. We find that by keeping the piston and cylinder walls cleaned in this manner, we get much more efficient operation, have less danger of stuck pistons and rings and less cylinder wear, or in other words less maintenance costs. However it takes a lot of hard work to rub these pistons and liner walls down and keep them in shape."

The writer can attest to that last statement, but if one has the time and the manpower available he can get an excellent job of cleaning by using this method. However there have been developed during the past few years, solvents which will remove the bulk of varnish and carbon by applying them to the entire piston with a brush, and allowing them to stand for a short time while these solvents cut through this residue.

These preparations are not harmful to the metal and when wiped off leave a fairly clean surface. They can be followed up with a portable polishing wheel driven by a motor with a flexible shaft, which really does a nice job of polishing and cleaning. Removal of high spots by filing is satisfactory, but should be followed by honing with a good grade of oil stone.

But regardless of what methods are used, clean pistons and cylinder walls are a condition highly desired and much of this cleaning and polishing can be partially averted by use of the proper fuels and lubricants, a subject discussed in the Supervisors section of this issue.

New Bulk Tank Preheater

A NEW Bulk Tank Preheater has been developed by Rempe Co. for preheating heavy liquids in bulk storage. It embodies features which make it distinct from any equipment heretofore employed.

Rempe Tank Preheater

This preheater can be made to fit any size tank having a manhole 16½ in. or larger and has thirty-eight square feet of direct radiation surface, plus 10 square feet of secondary shell heating surface. It is provided with a flow accumulator which makes it necessary for liquids to flow over the coils before entering the suction line—preheating is assured. Built for use with steam or hot water as desired by providing proper size inlet and outlet pipes at time of fabrication.

For full details write Rempe Co., 342 N. Sacramento Blvd., Chicago 12, Ill.

E. G. Cross Production Control Head For Crocker-Wheeler

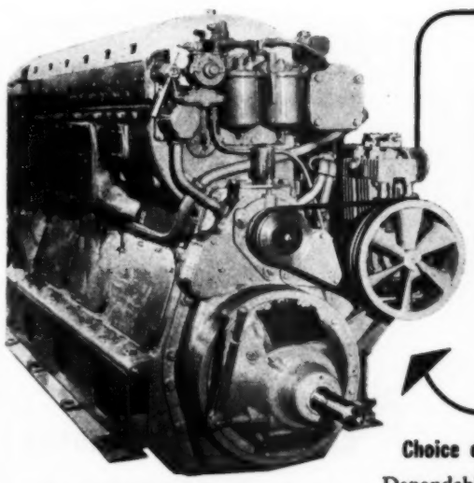
E. G. CROSS has been recently appointed Supervisor of the Production Planning and Control Department of the Crocker-Wheeler Division, Joshua Hendy Iron Works. Prior to his association with Crocker-Wheeler, Mr. Cross had already gained a wide experience in the industrial management field. His background covers managerial positions in methods and procedures, contracting, accounting, material control, production control and production.

E. G. Cross

Early in his business career, Mr. Cross was associated with Merck & Co. at Rahway, N. J., in their Methods and Procedures Department. From there he went to the Pacific Coast where his positions included: Senior Accountant a·

As the greatest mass transportation job in history progresses, American tugboats are demonstrating even more impressively their importance in keeping thousands of vessels moving on their appointed courses.

MORAN
Established 1860
TOWING & TRANSPORTATION
New York • New Orleans • San Francisco

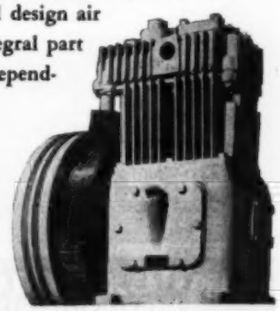


HENDY Series 20 MARINE DIESEL ENGINE Equipped with QUINCY COMPRESSOR

Quincy COMPRESSORS
for diesel starting

Choice of Leading Diesel Engine Manufacturers

Dependability and compactness are compressor "musts" when Diesel engines are started by air power. Quincy offers a line of advanced design air compressors that are easily installed as an integral part of Diesel equipment. They can be relied upon for dependable starting power over a long, trouble-free service life.



Sizes available from 1 to 80 cu. ft. displacement. Pressures up to 500 lbs. p.s.i. A Quincy compressed air specialist is ready to serve you. Ask him about your air problems.

QUINCY COMPRESSOR CO.
Dept. K-24, Quincy, Illinois
Branch Offices: New York • Chicago • St. Louis • San Francisco

YOU CAN SAFELY *Standardize* *on* AUTO-DIESEL
LADLE TEMPERED PISTON RINGS
. . . MANY HAVE SINCE 1921!

Down through the years many have standardized on AUTO-DIESEL "Ladle Tempered" Piston Rings because they have given such satisfactory service. For nearly a quarter of a century we have striven to produce the

best rings possible and the quality built into them has resulted in repeat business over a period of many years. They are used as original equipment and replacement for stationary and mobile units and for hydraulic and pneumatic operated industrial equipment.

Write for Information

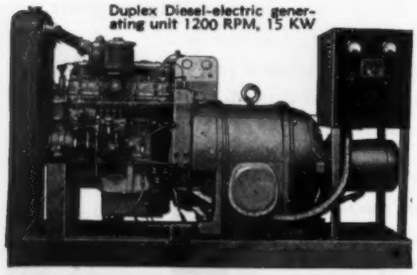
THE AUTO-DIESEL PISTON RING CO.
3151 SUPERIOR AVE. CLEVELAND 14, OHIO

QUALITY RINGS SINCE 1921

Generating Units
5 K.W. to 100 K.W. A.C. or D.C.

Close regulation of voltage and frequency is an outstanding feature of the generating units we build with either Diesel or gasoline prime movers. We are also equipped to supply any type of instrument panel required.

Manufacturers of engine generator sets for over 20 years.


Duplex Diesel-electric generating unit 1200 RPM, 15 KW

Duplex Truck Co.
Lansing, Michigan

the Kaiser-owned California Ship Building Corp.; in turn, Chief Cost Accountant, Chief of Material Control at Pacific Aviation, Inc.; preparation and installation of Production Control systems in an aircraft hydraulic parts manufacturing plant and two die casting plants; Production Manager at the Given Machinery Co.; and that of Chief Cost Accountant and Contract Officer at the Western Pipe and Steel Co., San Pedro Ship Building Division.

A graduate of Franklin and Marshall College at Lancaster, Pa. with an A.B. degree in Economics, Mr. Cross has done post graduate study at the University of California and at New York University.

25 Alco Diesel Engines for the Great Lakes Pipe Line Co.

THE Great Lakes Pipe Line Company has awarded a contract to the Diesel Engine Division of American Locomotive Company for the purchase of 25 Alco Diesel engines, Duncan W. Fraser, president of the locomotive company recently announced.

In announcing the sale, Mr. Fraser said the new Diesel units will help to increase the capacity of the Great Lakes system which extends from central Oklahoma through Minneapolis, Chicago, Milwaukee, Omaha, Sioux City, and Kansas City. The turbo-charged, 810 horsepower Alco Diesel engines will be used for driving centrifugal pumps through systems of step-up gears in pumping stations throughout the pipe line service.

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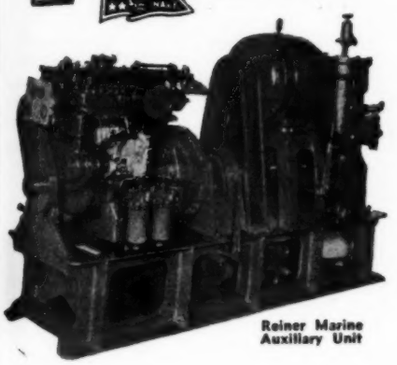

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Lewis G. Harriman Elected Sterling Engine Director

ADDISON F. VARS, president Sterling Engine Company, has just announced the election of Lewis G. Harriman, president of The Manufacturers and Traders Trust Company of Buffalo to his Board of Directors.

Lewis G. Harriman

"Mr. Harriman," said Mr. Vars, "has been closely associated with the development of the Sterling Engine Company for more than 20 years. His wide experience in the financial and industrial development of the Niagara Frontier eminently qualifies him to help guide our post-war expansion program now under way."

Among many other directorates held by Mr. Harriman are those on the boards of Delaware, Lackawanna and Western Railroad, National Gypsum Company, New York Telephone Company, Western New York Water Company, Healy Petroleum Company, Federal Reserve Bank (Buffalo Branch.)

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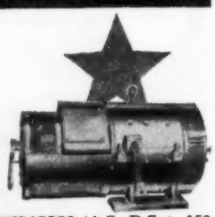

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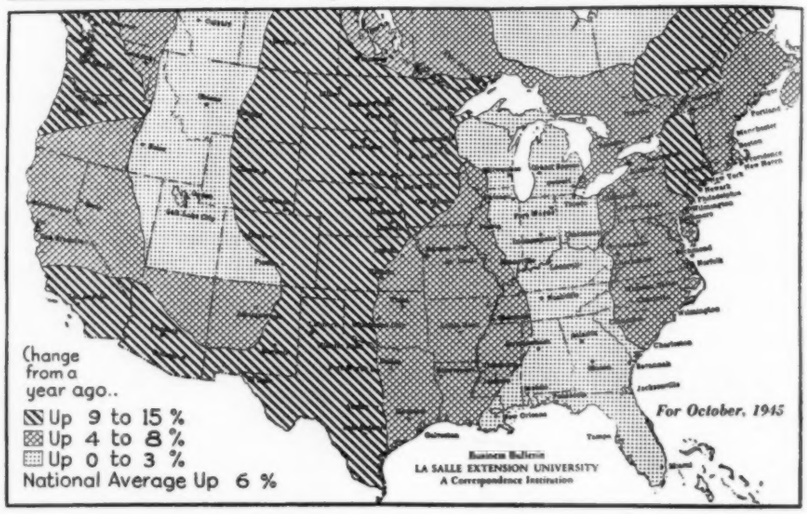
LaSalle Map of Business Conditions


Change from a year ago..
Up 9 to 15 %
Up 4 to 8 %
Up 0 to 3 %
National Average Up 6 %
For October, 1945
Business Bulletin
LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

Fall Business 6 Per Cent Higher Than a Year Ago

Map Supplied by BUSINESS BULLETIN DIVISION of La Salle

Business is holding up well this fall, even though activity in most lines has declined from the peak and also from a few months ago. The volume of trade has been maintained better than has the rate of industrial production. It is being kept at a high level by large amounts of consumer buying and the activity in many of the service industries where the demand is much above normal and very close to the peak. The usual seasonal influences have also been an important factor which nearly always boost business during the early fall months.

The general average of all business, including both prouction and trade, has fallen off until it is now about 6 per cent higher than it was a year ago. The output of factories has dropped about 14 per cent, due largely to the termination of war contracts and the reconversion of many plants from war work to peacetime production. Several weeks more will be needed before the majority of plants will be ready to go ahead with their normal production.

Variations among different parts of the country are wide, with business a little below last year in some communities while in other places it is over 15 per cent above last year. These spotty conditions will continue for some time as many readjustments must still be made. Reconversion is proceding very rapidly, however, and the period of greatly curtailed activity is likely to be much shorter than was generally expected a few months ago.

Business is making the best showing, as compared with last year, in areas outside the major industrial regions. The curtailment in industry has naturally been much greater than in other fields of business because industry has been most directly and immediately affected by the war spending. The areas and lines in which activity was highest a year ago are likely to be the ones in which comparisions between the two years will be least favorable.

The largest area of good business is the Middle West and it extends from the extreme north to the extreme south. Prospects for another bumper crop and good farm prices have helped maintain activity there. The other areas in which business is better than the national average are New York and the Pacific Coast states. The continued movements of troops and supplies through these regions have been partly responsible for the good showing in those places.

The largest area in which business has lagged behind the national average is the industrial region around the Great Lakes and to the east. Throughout much of the South, business has also been lagging somewhat, although activity there was quite high a year ago. In New England activity is about average but the trend is more favorable than in other parts of the country for in many plants reconversion has been more nearly completed.

Trade and industry in Canada has been gradually declining but it is still above last year. The drop in factory output has been partly offset by the continued high level of retail and wholesale trade as well as by some increases in the service industries. Agricultural conditions are good although crops will not equal last year's high output. Further readjustments will be made in many lines of business, but the general outlook is quite favorable.

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WEST COAST DIESEL NEWS

ANOTHER all-welded steel trawler joins the Oregon fleet—the 80-ft. *Yaquina* for the Oregon Fishing Corp., Portland, by Gunderson Bros. Her main engine, a Cummins 300 hp. Diesel at 1,000 rpm., gave her 10 knots on trial turning 50x27 wheel through Capitol 2/1 gears.

GENERAL Motors "Twin" Series 71, 6-cylinder, 330 hp. at 2,000 rpm., marine Diesels are main drive for the new 76-ft. fisherman for the Apex Fish Co. Engines were supplied by Evans Engine & Equipment Co., Seattle, Washington. A Lorimer 30 hp. Diesel handles auxiliaries.

POWERED with a single 100 hp. Lorimer Diesel, the 55-ft. Ed Monk-designed *Eloise III*, a tuna boat, has been launched by Grandy Boat Co., Seattle, Washington, for Bill Rockam.

HER main engine a 450 hp. Hendy marine Diesel turning a 66-in. Coolidge wheel, the 84-ft. tuna boat *Astorium* has been completed by Seattle (Washington) S. & D. Co., for Johnson Bros. All her pumps are by F-M Co.

BUILT at Noyo Harbor, California, by Mauricio Boat Works for Fort Bragg Wanahala Bros., the 68-ft. trawler *Anna W* has Caterpillar marine Diesel drive, the main engine a 125 hp. with Twin Disc gears for ten knots and 75 net tons.

PREVIOUSLY tank-tested by model, the new 136-ft. tuna clipper building at Western Boat Co.'s Tacoma, Washington plant, will have a 950 hp. main Enterprise Diesel and three auxiliary Diesels by Caterpillar turning generators. Pumps are by F-M Co.

REPOWERED by Evans Engine & Equipment Co., Seattle, Washington: the trawler *Tyne* gets an 82 hp. Diesel; the tug *Deck Boy* an 165 hp. Diesel; and the dragger *Restitution* a 165 hp. Diesel—all General Motors.

DIESELS

75 KW—AC Generator Burke—3/60/240-480
New 1938—1200 RPM
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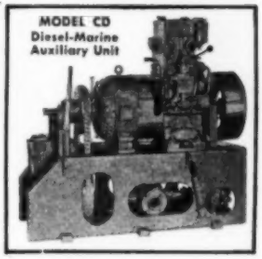

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AIR COMPRESSOR—11 or 20 c.f.m.
PUMP—60 or 90 r.p.m. at 60#.
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GENERAL Motors Diesels will be distributed from a new office recently opened at 55 New Montgomery St., San Francisco, California, in charge of H. M. Estes of Moore Equipment Co. A. F. Cheney, district sales supervisor, Detroit Diesel Engine Division, is making his temporary headquarters at new location.

THE new 55-ft. *Trojan*, tuna boat powered with a 115 hp. Caterpillar marine Diesel, has been delivered to San Diego for Sam Meserve.

COMPLETED at Gardiner, Oregon, by Fred Schulte for the Van Camp Sea Food Co., Terminal Island, California, the 67-ft. *Sheryl* is 65 tons net and is powered with a 125 hp. Caterpillar Diesel.

EIGHTY foot over all, the new purse seiner *Brigadier* has been completed by Grandy, Seattle, Washington, for Jack Suryan. Engine is a 80-hp. Lathrop Diesel and batteries are by Willard.

AT the Tacoma (Washington) Boat Building Co., the new 82-ft. sardiner for Joe Ancich, Gig Harbor, is getting an Enterprise 400 hp. marine Diesel.

THE Crowley Launch & Tugboat Co., San Francisco, is repowering one of its older tugs with a new twin 6 cyl., 330 hp. General Motors marine unit with Snow & Nabstedt reverse gear and 6.1 reduction gear.

ANOTHER General Motors Diesel installation is that of the 49-ft. combination boat *Tira*, Santo Balesteri, owner—a 110 hp. engine with Twin Disc gears.

A NEW 35-ft. combination fish boat is under construction by Sausalito (California) Shipbuilding Co., for Len Giraldi. Engine is a 40 hp. Caterpillar, with Twin Disc gears; batteries are Exide.

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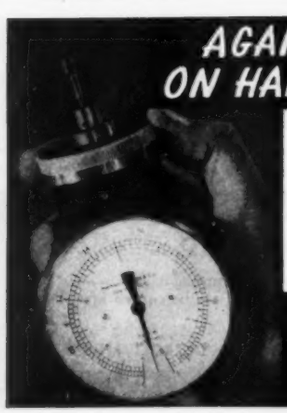

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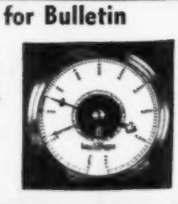

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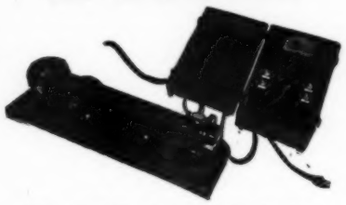

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THE Coast Guard's new tender *Bluebell* by the Birchfield Boiler & Shipbuilding Corp., Tacoma, Washington, has for main engines a pair of Murphy supercharged marine Diesels of 165 hp. each turning Columbia wheels through Twin Disc gears. Searchlights are by General Electric and batteries by Edison. Auxiliary Diesel is a 36 hp. Hill.

ANNA B, well known 80-ft. San Francisco, California purse seiner owned by Billante Bros., has been repowered with a new 250 hp. Atlas marine Diesel.

STERLING Shipyard, Vancouver, B. C., has completed the new 57-ft. *Taplow,* a tuna boat, powered with a 115 hp. Caterpillar marine Diesel using Twin Disc gears.

MICKEY CASHIN of Bamfield, B. C., will take delivery of a new 42-footer built by Tofino Machine Shop, Victoria, B. C. Her engine is a Cummins Diesel with direct drive.

THE new steel 56-ft. trawler *Thoreen* built by the N. C. Jannsen Co., Seattle, Washington, for Thor Botten will also have a Mack Mariner 125 hp. Diesel with Twin Disc gears.

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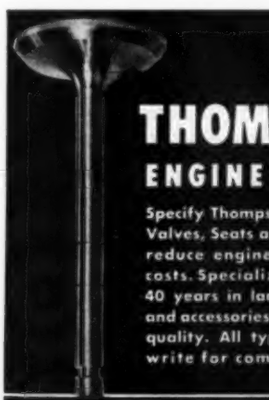

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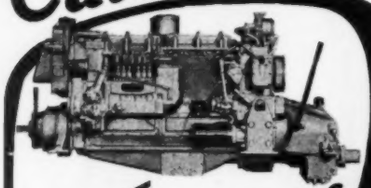

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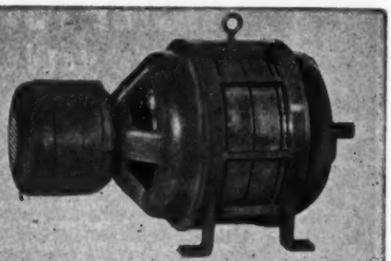

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